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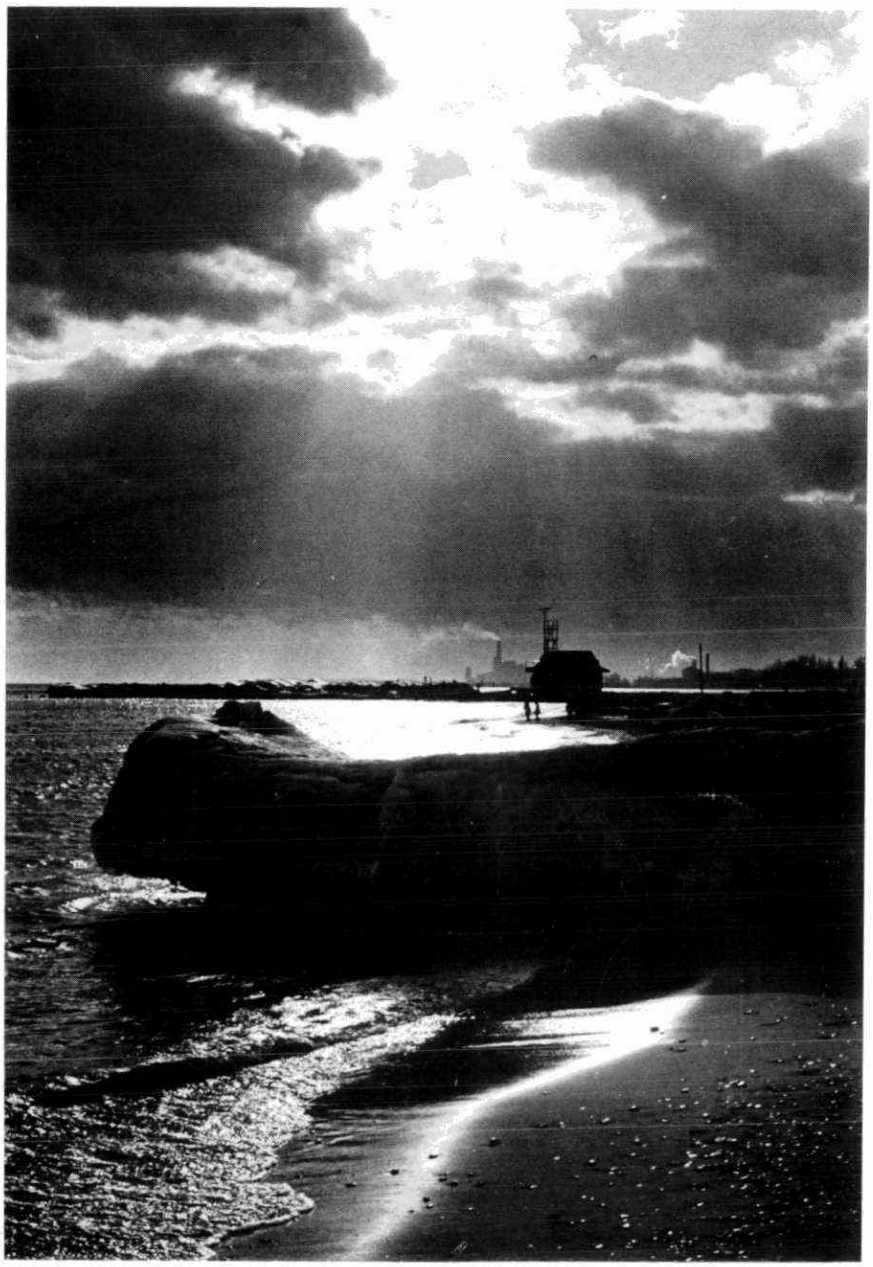

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Ministry of the Environment

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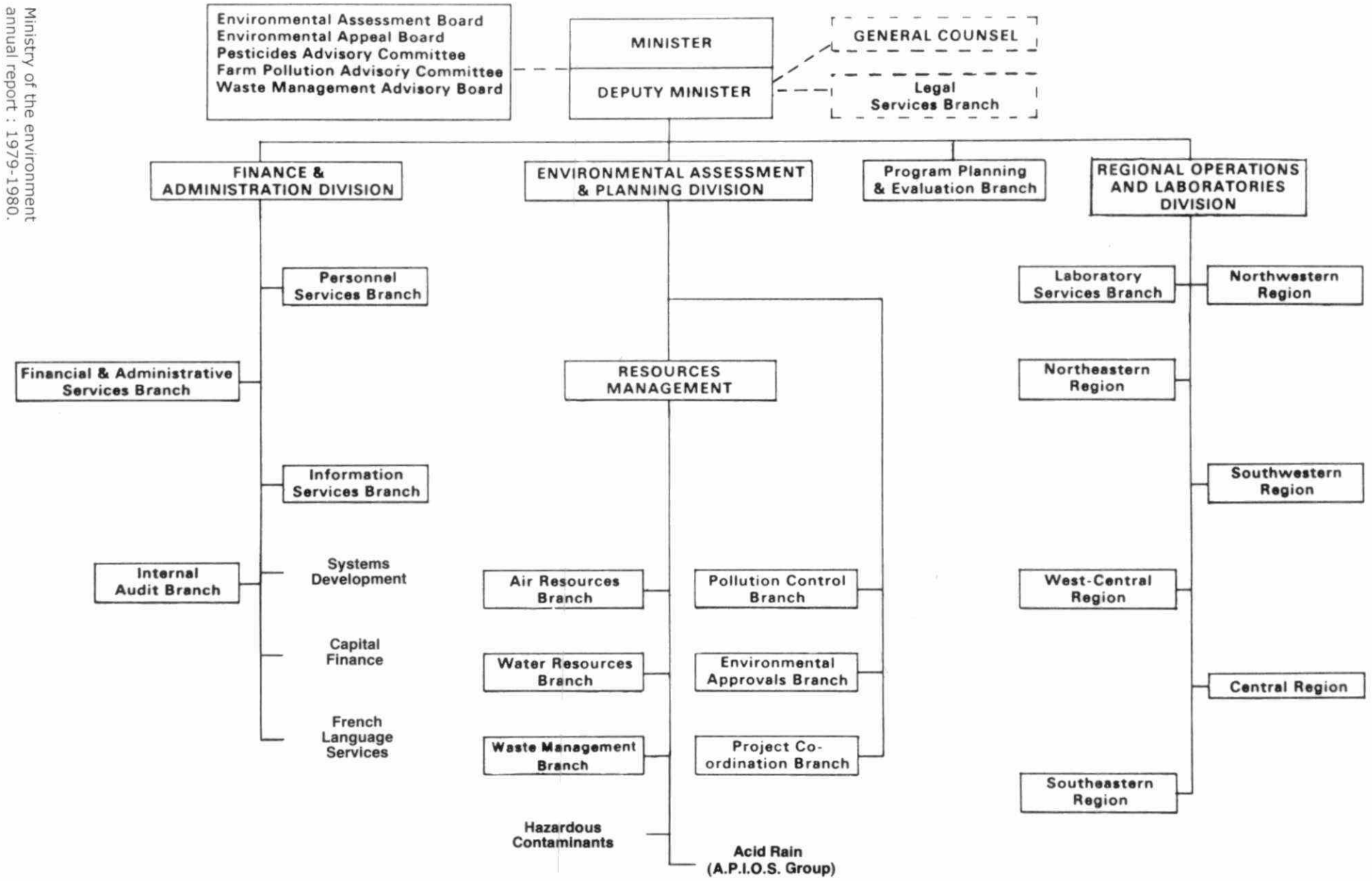
MINISTRY OF THE ENVIRONMENT—AUGUST 1, 1980



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contents

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Organization Chart ..... **Frontispiece**
Letters of Transmittal 2
The Ministry—Past and Present 3

Deputy Minister 5
Program Planning and Evaluation Branch 5
Legal Services Branch 6

Environmental Assessment & Planning Division 7
Air Resources Branch 7
Water Resources Branch 10
Pollution Control Branch 16
Environmental Approvals Branch 19
Project Co-ordination Branch 21
Waste Management Branch 25

Regional Operations and Laboratories Division 29
Northwestern Region 29
Northeastern Region 32
Central Region 33
West-Central Region 35
Southeastern Region 37
Southwestern Region 39
Laboratory Services Branch 42

Finance and Administration Division 47
Financial and Administrative Services Branch 47
Capital Finance 48
Systems Development 48
Internal Audit Branch 49
Information Services Branch 49
Personnel Services Branch 51
French Language Services 52

Boards and Commissions 53
The Waste Management Advisory Board 53
The Environmental Assessment Board 54
The Pesticides Advisory Committee 54
The Environmental Appeal Board 55
The Farm Pollution Advisory Committee 55
The Royal Commission on the Northern Environment 56

Appendices—Charts and Tables 57
Annual Total Expenditure by Project Type 1979-80 57
Annual Total Expenditure by Class. Capital Construction Program 1979-80. 57
Number and Value of Contracts Tendered Annually 1979-80 58
Annual Volume of Activity 58
Laboratory Workload by Region/Branch—1979-80 59
MOE Programs—Laboratory Support 60-61
Ontario Air Pollution Index—1970-1980 62

To:

The Honourable
Harry C. Parrott, D.D.S.
Minister.

Sir,

I have the honour to submit for your approval the annual report of the Ministry of the Environment for the year 1979-80.

Respectfully submitted,

Graham W.S. Scott, Q.C.
Deputy Minister

To:

His Honour,
The Lieutenant-Governor
of the Province of Ontario.

May it Please Your Honour,

I have the privilege to present the annual report of the Ministry of the Environment for the fiscal year beginning April 1, 1979, and ending March 31, 1980.

Respectfully submitted,

Harry C. Parrott,
Minister

The Ministry—Past and Present

In the brief span of 20 years, the field of environmental protection has grown from the concern of a handful of visionaries to a major responsibility of government agencies around the world.

At the forefront of this tremendous surge of human awareness and the development of modern pollution abatement technology has been the Government of Ontario which established the Ontario Water Resources Commission in 1957, the first agency of its kind in the world.

Ontario was among the first to take further steps in protecting its natural environment by establishing an effective system of air pollution control and other units to deal with environmental issues, such as waste management and controls in the use of pesticides. The formation of the Department of the Environment followed in 1970 and all the Province's environmental agencies were amalgamated into the Ministry of the Environment in 1972.

Goals

This pioneering commitment to environmental protection has led to research, legislation and policies which have made the Province a recognized leader in the environmental field. To provide Ontario's 8.5 million citizens with effective environmental management the Ministry has set four major goals:

1. To ensure proper control over the emission of contaminants into the natural environment for the purpose of achieving and/or maintaining predetermined standards of environmental quality.
2. To ensure that proposed programs, projects, policies and legislation in/or affecting Ontario incorporate the necessary environmental safeguards through direct involvement in the co-ordination and development of a provincial land use plan.
3. To foster the improved management of waste and water to achieve a more efficient use of natural and material resources.
4. Where the above measures are not sufficient, to develop specialized techniques for the restoration and enhancement of environmental quality.

To achieve these goals, the Ministry has established four programs:

1. Ministry Administration Program
2. Environmental Assessment and Planning Program
3. Environmental Control Program
4. Resource Recovery Program

Ontario's Environmental Legislation

The Environmental Protection Act, 1971:

This Act covers all types of pollution, forbidding the discharge of any contaminant to the natural environment in amounts or concentrations exceeding those prescribed by regulation. Contaminant definition includes solids, gas, liquids, odours, sound, vibration, radiation or combination of any of these which result directly or indirectly from activities of man and may cause injury to humans, flora or fauna.

In addition to regulated limits, the Act prohibits any discharge that is likely to impair the natural environment, injure or damage plant or animal life, cause harm or discomfort to any person, affect the health or safety of any person or render any property, plant or animal life unfit for use by man.

The Ontario Water Resources Act:

This Act gives the Ministry of the Environment extensive powers to regulate the water supply, sewage disposal and the control of water pollution. It authorizes the Ministry to supervise and examine all surface waters and ground waters in Ontario, to determine the extent, nature and causes of contamination in these waters.

The Ministry can construct and operate water waste treatment facilities, or it can require an industry or municipality to construct and operate approved facilities.

The Environmental Assessment Act, 1975:

This Act provides for the assessment of any proposed major undertaking, governmental, municipal or private, at the very earliest stage to permit alteration or even cancellation of the undertaking should it be environmentally unacceptable. It also provides for full public participation in the decision-making process. It is being implemented in stages, applying first to major provincial and certain municipal undertakings. Preliminary discussions are now underway on extending the Act to the private sector.

The Pesticides Act, 1973:

This legislation restricts the storage, distribution, sale and use of pesticides. The Ministry examines and licences professional exterminators and maintains a classification system to ensure that hazardous chemical pesticides are not handled or used by unqualified persons.

Report 1979-80

During 1979-80, the Ministry advanced on many fronts. The activities and achievements of Ministry programs and initiatives are reported by Divisions, Operating Branches and Regions in the following pages.

FROM THE OFFICE OF:
G.L. Van Fleet, Supervisor
Municipal & Private Section

TO: ~~G. Missingham~~
~~D.M.C. Saunders~~
~~J. McNeely~~
~~P. Walsh~~
~~P. Seto~~
~~F. Iliffe~~
~~J. Archer~~
~~B. Hogarth~~
~~R. Bendins~~
~~E. Dolinar~~
L. Stojko
~~S. Cherry~~
L. Karapalevski
M. Kekesi

FOR: Information
Action
Discussion

Circulation
Your Files
Discard
Return to MPhib.

COMMENTS:

deputy minister

Deputy Minister—G.W.S. Scott, Q.C.
Executive Assistant—R.G. Clark

Program Planning and Evaluation Branch

Director: A. Castel

The Program Planning and Evaluation Branch is concerned with the effective management and efficient use of Ministry resources, both short—and long-term. The Branch co-ordinates and analyzes Ministry policies and programs; provides liaison with the government's central agencies; and co-ordinates policy submissions. During 1979-80, a Ministry policy approval process was developed involving the preparation and maintenance of a Ministry Policy Manual.

The Branch develops and maintains Ministry long-range and operational planning systems. At year-end, the Ministry's goal statement was being examined and a strategic planning process developed. The Branch co-ordinates the resource allocation process through which the annual budget of the Ministry is determined. It also administers in-year reallocations of manpower and finances on the basis of priority, develops the annual work program and maintains the management-by-results system. The Branch increased its participation in planning and socio-economic studies on major environmental issues.

The following major studies and projects were completed or being prepared in 1979-80:

(1) new product opportunities in Ontario in the pollution control equipment field;
(2) development of the Ministry's capital construction program;
(3) an index of statistical files and computer systems;
(4) summaries of findings and conclusions of three Ontario government reports on the pulp and paper industry;
(5) financial assistance available to Ontario companies for pollution abatement expenditures;
(6) the economic effects of pollution abatement on the pulp and paper industry: results of an econometric study;
(7) a critique of policies and regulations for carbonated soft drink containers.
(8) developed a background paper on proposed socio-economic studies to be undertaken by the Ministry as part of its acidic precipitation program.

Legal Services Branch

Director: J.N. Mulvaney, Q.C.

Staff of Legal Services Branch are employed by the Ministry of the Attorney General and provide legal services on a solicitor and client basis to the Ministry of the Environment.

A major function of the Branch is the conduct of prosecutions under environmental legislation. The Branch screens cases being considered for prosecution, advises on the best methods of gathering and presenting evidence, and provides counsel to present these cases in court. In addition, it acts as counsel for any Director whose decision under a statute is being reviewed in a hearing before the Environmental Appeal Board or other review tribunal.

On two occasions during 1979-80, injunction proceedings were taken to bring about compliance with Ministry Orders or with the legislation.

During the year, Legal staff handled 105 cases before the courts under The Environmental Protection Act, The Ontario Water Resources Act and The Pesticides Act. Of these, 46 cases resulted in convictions; 11 cases resulted in dismissals (three of which were under appeal at year-end); two cases were withdrawn. The remaining cases were still before the courts at year-end. Staff also handled a number of minor offences under the boating regulation and vehicle prosecutions.

Other legal services included: acting as counsel in arbitration hearings under construction contracts; advising on the appropriate application of the Ministry's powers; advising on the form of documents and orders that can be issued by Directors under the legislation; providing legal advice to the operating Branches; preparing Orders-in-Council, regulations, contracts and Orders.

environmental assessment and planning division

Assistant Deputy Minister: J.W. Giles
Executive Director: W.B. Drowley

This Division has three major responsibilities which provide a scientific base for many of the Ministry's policies and activities:

To serve as the central approval and co-ordinating agency for applications involving the design, construction and operation of water, sewage, solid waste reclamation and recycling plants and waste disposal sites required under Ontario legislation.

To conduct scientific and technical research, assessment and pollution control programs involving the use of water, land and air resources, the environmental implications of realty development and the control of all forms of pollutants.

And, to provide technical and supervisory services required in the planning, construction and operation of water and sewage treatment plants, solid waste and resource recovery facilities.

Air Resources Branch

*Director: T.W. Cross

The Air Resources Branch supplies base information for the development of air quality management strategies and Ministry policies directed at achieving and maintaining desirable air quality in Ontario. The information consists of comprehensive air contaminant measurements, detailed knowledge of new technology and recommendations concerning air quality criteria and standards.

Air Quality and Meteorology

The Air Quality and Meteorology Section maintains the data base and telemetry system of Ontario's air monitoring network, which included approximately 1,400 instruments in 100 areas in 1979-80. This network produced approximately three million data points that were computer processed, validated and interpreted in published reports. The following pollutants were routinely monitored: sulphur dioxide, nitrogen oxides, carbon monoxide, ozone, hydrocarbons, total reduced sulphur, dustfall and total suspended particulate matter, including its components (sulphate, nitrate, lead and other trace metals). Sulphation and fluoridation rates and the soiling index were also routinely measured.

All continuous air pollution monitors undergo rigorous audition and calibration checks on a regular basis by the Sections Calibration Unit to insure the validity of measured data. During 1979-80, the Ontario Ministry of the Environment became the first Canadian environmental monitoring agency to adopt ultraviolet photometry as its ozone standard. This action was undertaken to ensure compatibility with ozone monitoring being conducted in U.S. States along Ontario's border according to methods required by the U.S. National Bureau of Standards.

The Ontario Air Pollution Index, the basis for Ontario's Alert System, was expanded into St. Catharines during 1979 and continued to be monitored and publicized daily for Windsor, Sarnia, Hamilton, Niagara

*T.W. Cross was appointed director of the Environmental Approvals Branch in September 1980.

Falls, Toronto, Sudbury, Coniston and New Sudbury. Air pollution index readings from 1970 to 1980 can be found in appendices.

A study of airborne particulate nitrate and its relationship to large-scale weather systems indicated high concentrations were associated with southwesterly airflows that advected nitrates from long distances into Ontario.

An operational air trajectory model was utilized in the analysis of historical data to determine the relationship between the chemical components of precipitation and long-range transport of air pollutants. Continued study of the acidity of precipitation in regions of Central Ontario and its relationship to distant pollutant sources has further confirmed the importance of sources at distances greater than 1,000 km.

A model to predict short-term pollution concentrations from elevated sources under convective atmospheric conditions has been developed and validated with data collected during field studies in the Sudbury area.

A long-term, long-range statistical model has been used to estimate sulphur dioxide and sulphate concentrations over a grid covering the north-eastern United States and Canada.

A study of the trend of airborne particulate lead indicated that a 59 per cent decrease in lead concentrations during the period 1972-78 correlated well with a reduction in the lead content of gasoline during those years.

During 1979-80, the staff of the Air Quality and Meteorology Section published nine papers in scientific journals and presented five papers to technical conferences.

Criteria Development and Program Planning

The Criteria Development and Program Planning Section established guidelines for 12 new air contaminants in the Province and prepared detailed reports on 30 environmental assessments. Section members also worked on three federally organized task forces to produce federal regulations and guidelines for various industries.

The Section, Southwestern Region and related industry, finalized a new regulation for SO_2 emissions in the Sarnia area. The regulation also provided for a comprehensive ambient air sampling network as part of the control mechanism.

The Section and the Land Use Co-ordination Section of the Environmental Approvals Branch developed the rationale and suggested dimensions for the "Industrial Influence Area" recommended in the Haldimand-Norfolk Regional Plan.

The Section undertook a cost-benefit study of clerical support systems for the Branch that resulted in acceptable revisions for more efficient, less costly service.

Phytotoxicology

The Phytotoxicology Section conducted soil and vegetation assessment studies near 129 industrial and other sources in Southern Ontario in 1979-80. Investigation reports were provided to regional managers for use in environmental management programs. The Section also investigated 230 vegetation complaints from the public of which 45 per cent were confirmed as being caused by pollutants. Investigation reports were provided to the complainants, the alleged offending sources, regional managers and the Board of Negotiation.

The Section investigated the effects of fluorides emitted by industries manufacturing hydrofluoric acid, fertilizers, steel, aluminum, uranium hexafluoride, brick, ceramic, frit and glass. The Section also investigated the effects of sulphur dioxide, lead, boron, ethylene, nickel, cobalt and mercury emitted by various industries in Southern Ontario. In the City of Toronto, soil that had been replaced on residential properties adjoining several industries was retested for lead content.

Biological monitors consisting of fluoride sensitive gladiolus plants were established in the vicinity of eight industries to monitor atmospheric fluorides. Indicator plots consisting of plants selected to differentiate between effects caused by photochemical oxidants, sulphur dioxide and ethylene were established. Networks of sphagnum moss bags were established in the vicinity of several industries to determine the degree and extent of heavy metal deposition.

During the 1979 crop-growing season, the Section conducted extensive field assessment surveys to determine the degree of photochemical oxidant (ozone and/or peroxyacetyl nitrate) injury on white bean, tomato and potato crops. Oxidant injury to crops was less severe in 1979 than in 1978.

At Nanticoke, the Section continued studies where major operations by Ontario Hydro, Stelco and Texaco are planned. No fluoride or sulphur dioxide injury has been observed on vegetation in the study area to date, but ozone injury has occurred annually on established indicator plants.

The Section collected 9,762 vegetation and soil samples for laboratory examination (chemical analysis, herbarium, pathology and histology). Phytotoxicology guidelines for excessive levels of contaminants in soil and vegetation have been developed for excessive levels of contaminants in soil and vegetation have been developed for 19 contaminants. The Section conducted a number of research studies both in the field and in controlled environment greenhouse and growth chamber facilities. Some studies involved differential diagnosis of contaminants and crop injury protection.

A phytotoxicology display on the effects of various contaminants on vegetation was shown at the International Plowing Match at Chatham in September 1980.

During 1979-80, three phytotoxicology papers were published in scientific journals; seven papers were presented to technical conferences; 21 extra-ministerial activities were undertaken by phytotoxicology staff in conjunction with provincial, national and international committees and task forces.

Technology Development and Appraisal

The five units of the Technology Development and Appraisal Section conducted a wide range of investigations in support of Air Management Branch activities in 1979-80.

The **New Technology Unit** kept the Branch informed of technological developments in control methods and industrial processes. The relationship of current and developing technologies to contaminant emissions and the control of these emissions were reviewed and assessed for the benefit of the Ministry as a whole.

The Unit monitored developments in methods for reducing sulphur dioxide and oxides of nitrogen emitted by utilities, metallurgical industries and industrial combustion sources, particularly with regard to the problem of acidic precipitation. Not only were methods of removal from the exhaust flue gases studied, but methods of avoiding their production, such as coal desulphurization and gasification, were also examined. The knowledge gained in the process aided examination of specific regional problems, especially of odours and particulate emissions.

The Unit spent considerable time studying and developing methods of destroying PCBs, including the burning of PCBs in a cement kiln at St. Lawrence Cement in Mississauga.

The Unit is responsible for establishing inventories of potentially hazardous contaminants. During the year, Acres Consulting Ltd. completed a survey of specified chlorinated and aromatic hydrocarbons under a contract let the previous year. A data handling system for this information was developed and data entry was initiated. At year-end, the system was being extended.

The **Monitoring and Instrumentation Development Unit** conducted intensive ambient air monitoring surveys in Nanticoke, Mississauga, Sudbury, Sarnia, Cornwall, Guelph-Kitchener and Port Hope.

Following the derailment of railway tank cars in Mississauga, the Unit operated an extensive monitoring program for chlorine in the affected area with the contracted assistance of Sciex Inc. Sciex Inc. also helped the Unit operate the TAGA 3000 mobile laboratory in the development of methods for monitoring PCBs in ambient air and stack gas.

The Unit organized and participated in a Province-wide PCB survey in ambient air. A substantial portion of the work was performed by contractors (Nucrotechnics, Moniteq and IEC) and the Laboratory Services Branch.

The high resolution gas chromatograph was brought on-line during the year, with its performance-testing conducted on synthetic PCB samples. It was used with a capillary column to analyze more than 700 air samples collected in the Province-wide PCB survey.

The Unit worked towards increasing the Branch's monitoring capabilities. At year-end, it was working on methods of detecting different organic contaminants at parts per billion (ppb) and sub-ppb levels, the preparation and long-term stability of standards and different presentation techniques.

The **Special Studies Unit** is responsible for the co-ordination of activities under the Nanticoke Environmental Management Program (NEMP), the Sudbury Environmental Study (SES) and the Atmospheric Research Program in the Acidic Precipitation in Ontario Study (APIOS).

Routine particulate, gaseous pollutant and precipitation monitoring continued in the Nanticoke area. The data from the NEMP network, together with results of measurements made by other groups (Ontario Hydro, the West-Central Region) was deposited in the NEMP data base and reported monthly. By year-end, a year's data had been accumulated and a first-draft report prepared and distributed for comment.

Mathematical modelling progressed with the validation of the summertime fumigation air quality model, based on data from past intensive studies in the Nanticoke area. A study was carried out in May and June of 1979 to measure: 1) sulphur dioxide concentrations at ground level and aloft during fumigations of the Hydro generating station plume, as well as plume sulphur dioxide oxidation rates, and 2) ambient concentrations of individual hydrocarbons in the vicinity of the Texaco refinery. Several papers related to the Nanticoke mathematical model were published in scientific journals and presented at conferences. A real-time data acquisition and processing system was installed; air quality reports from Nanticoke were being transmitted to the Air Resources Branch in Toronto at year-end.

Field monitoring activities continued in the Sudbury Environmental Study and several projects (e.g., the meteorological measurements program, the study of sulphur dioxide oxidation in the Inco plume under various meteorological conditions) were completed and their results presented in reports and scientific publications. Three intensive studies were carried out: emphasis was upon 1) emission rates and chemical and physical characterization of particulates in the Inco and Falconbridge stack plumes, and 2) dispersion and fumigation of the Inco 381-metre chimney plume under Summer convective conditions.

Mathematical modelling of smelter effects on air quality in the Sudbury basin was nearing completion at year-end. During the year, overall emphasis in the SES Atmospheric Research Program was upon data analysis, especially concerning the effect of smelters on precipitation chemistry and deposition and several important advances were made in this area.

Most of the effort in the Acidic Precipitation in Ontario Study has been concentrated on setting up the Atmospheric Deposition Monitoring Program. This work included finalization of the wet/dry monthly and event deposition monitoring network design, site selection and inspection, development of sample collection and handling procedures. Discussions were held with other agencies regarding co-operation in the areas of sampling and data exchange. An intercomparison study of the precipitation sampling and analysis methods used by the Ministry, the Atmospheric Environment Service and the Canada Centre for Inland Waters was undertaken. A plume washout study was also

initiated at the two largest point sources of sulphur emissions in Ontario: the Inco smelter at Sudbury and the Hydro generating station at Nanticoke. The study is to assess the impact of these sources on precipitation quality by direct under-plume measurements of rain during specific events.

The **Hazardous Contaminants and Research Planning Unit** is responsible for co-ordination of activities under the Branch's hazardous contaminants, research grants and emergency response programs. During 1979-80, background reports on polycyclic aromatic hydrocarbons, aromatic amines and azo dyes were completed. A major program to characterize the physical and chemical properties of the inhalable portion of airborne particulate matter was initiated. Programs to co-ordinate development work by the Regions, the Air Resources Branch and the Laboratory Services Branch on: 1) organic vapors sampling and analysis, and 2) a sampling kit for non-routine situations was continued from 1978-79.

The Research Grants Program sponsored 21 projects amounting to $280,000 at 11 universities. The Unit managed five additional major research projects under Provincial Lottery Trust Fund sponsorship.

The **Source Assessment Unit** is responsible for the co-ordination of source testing in support of various abatement and emission survey programs, the specification and writing of source testing methods, the initiation of research on measurement techniques and the design and the conduct of emission testing. Of special interest in 1979-80 were programs to evaluate the effectiveness of novel technologies for abatement of coke oven emissions, including polyaromatic hydrocarbons; measurements of background PCB levels in emissions from a cement kiln; and the evaluation of associated novel sampling techniques.

The Unit overviewed source sampling programs in support of various abatement programs in 40 industrial plants and evaluated 27 source testing reports. The Unit was responsible for the design, erection and maintenance of the sampling line for the TAGA 3000 mobile laboratory. The Unit also designed and performed source testing for the Sudbury Environmental Study, the Nanticoke Environmental Management Program and the Automotive Paint Baking Program.

Vehicle Emissions

During 1979-80, the Vehicle Emissions Section stopped 6,627 cars in 20 locations throughout Ontario in spot checks for emission controls and exhaust pollutant levels. Of all cars tested, 49 per cent failed to meet Ontario emission guidelines, while 272 cars were found with pollution control equipment missing, disconnected or inoperative. Twenty-six charges were laid against vehicle owners. Owners in 11 cases were found guilty and fined; two cases were dismissed; 13 cases were still pending at year-end. In August, the voluntary guidelines became mandatory standards following the introduction of O. Reg. 561/79. Extensive publicity brought the standards to the notice of the automotive trade and the public, and the section began enforcing the new provisions.

Section inspectors visited 439 used-car dealerships and inspected 1,828 cars under Section 23 of The Environmental Protection Act. As a result, 99 Violation Notices were issued, all of which were satisfactorily cleared before the vehicles were sold.

Highway patrols in co-operation with OPP personnel resulted in 530 vehicles being stopped for excessive smoke emissions. Subsequently, 108 warnings and 422 charges were issued by the OPP under the provisions of Section 49 of The Highway Traffic Act. Vehicle owners in 350 cases were found guilty and fined; eight cases were dismissed; 64 cases were pending at year-end.

Section personnel made 26 visits to nine community colleges to explain provisions of The Environmental Protection Act and the Ministry's control programs to student mechanics. Presentations were made to 71 classes comprising 2,105 apprentices.

In a joint evaluation program undertaken with the Research and Development Division of the Ministry of Transportation and Communications, the Section carried out 156 tests on 36 vehicles while studying the relationship between engine performance, engine maintenance, fuel economy and pollution control.

Water Resources Branch

Director: D.N. Jeffs

The Water Resources Branch provides a number of services and programs, including water resources planning and co-ordination and the development of policies and guidelines relating to water resources protection and management. The Branch co-ordinates and gives policy direction for inventory programs and data processing and analyzes and publishes monitoring and inventory data. It provides specialized technical advice to Regional staff and technical training and method development in support of Ministry programs. It also provides Inter-agency liaison and technical representation on International Joint Commission (IJC), Inter-Ministerial and other committees.

Great Lakes

The Branch provided total phosphorus loadings for all significant tributaries to the Great Lakes from the Canadian portion of the drainage basin for the 1978-79 water year. These data were used in reporting on the state of the Great Lakes in the International Joint Commission's 1979 Water Quality Board Report.

The Branch continued to participate in the work of the IJC's International Great Lakes Diversions and Consumptive Uses Study Board. Information prepared by the Branch on withdrawals and consumptive water uses in Ontario are to be incorporated in the Study Board's final report to the IJC in 1981.

The Branch continued to participate in dealings with Ontario Hydro on issues related to: 1) entrainment of larval fish and impingement of fish at cooling water intakes, and 2) aquatic biota habitat impacts of waste heat discharges at the major nuclear and thermal electric generating facilities located on the Ontario shorelines of the Great Lakes.

During 1979-80, the Ministry reached agreement with Ontario Hydro on a cooling water discharge outlet design at the Darlington "A" Generating Station that will afford environmental protection for the adjacent fish habitat. Agreements were also made with Ontario Hydro to investigate methods to minimize entrapment or impingement of fish at cooling water intakes at the Nanticoke and Bruce Generating Stations.

Young-of-the-year minnows (spottail shiners) have been collected from various sites along the Great Lakes shoreline over the last five years and used as monitors of pesticides, PCBs and Mirex levels. These fish provide an indication of local contaminants input due to their limited exposure period and range. Declines in PCB levels were most pronounced in 1979-80; the same trend was observed for DDT, although to a lesser extent. These changes reflect the general restriction placed on those compounds. Mirex concentrations also declined to the point where they were at trace or nondetectable levels in spottail shiners.

The following are highlights of the Ministry Great Lakes Surveillance program:

Lake Superior: Total phosphorus, dissolved oxygen and phenol levels associated with Thunder Bay inner harbour and the river mouths showed some improvement from 1977-78 levels. Non-compliance of dissolved oxygen in 1979-80 was restricted primarily to the river mouths while phenol levels in excess of 1 ug/L were restricted only to a distance of 2 km offshore.

St. Mary's River: Cyanide and ammonia levels in the St. Mary's River during 1979-80 were in compliance with the Agreement and provincial objectives. Phenol levels show no significant changes from those in 1978-79 and remained above the Agreement objectives despite the installation by Algoma Steel Corporation of new coke oven by-product recovery facilities aimed at reducing the phenolic loads. The Company is currently investigating the remaining source(s) of high phenol loading. Phase I of Great Lakes Power construction was completed. Data collected by the proponent indicated no impairment of river water quality during this stage. A monitoring program was proposed by the proponent for Phase II construction and was approved by the Ministry.

Lake Huron: Continued monitoring of total phosphorus levels in Penetang Harbour showed that levels in 1979-80 decreased by about 20 per cent. A reduction in total phosphorus loading from sewage treatment plants contributed to this improvement.

The Ministry recommended that total phosphorus levels in the sewage treatment facility for Midland be reduced to 1 mg/L. Monitoring of Midland Harbour Bay will continue to assess the effectiveness of this remedial measure.

Under the International Great Lakes Surveillance plan, Lake Huron is designated for intensive monitoring during 1980-81. This plan will update prior environmental baseline data for the Canadian coastal zone of Lake Huron, Georgian Bay and the North Channel.

St. Clair River: The St. Clair River organic study was completed and three of six reports were published. Findings of these reports indicated that significant improvements in the river environment have taken place during the last decade. Remedial measures undertaken at municipal and industrial source discharges were major contributors to the observed improvements.

Lake Erie: A two-year international study of Lake Erie water quality was completed in 1979-80. A final report to be presented to the IJC in 1981 will outline the lake's response to remedial measures implemented since the signing of the Canada-US Water Quality Agreement in 1972. Results have shown significant improvement in the biological communities of the western basin since 1968. Total phosphorus levels in the basin remained below the high levels of early 1970s. Totoal phosphorus concentrations in the eastern basin have remained relatively constant since the initiation of phosphorus controls in 1970.

Since 1969, water quality conditions and currents in the nearshore area of Lake Erie at Nanticoke have been under surveillance to provide a baseline for determining the effects of future industrialization. Various studies carried out under the Nanticoke Environmental Committee comprising representatives of the Ministry, the Ministry of Natural Resources, Stelco, Texaco and Ontario Hydro, were summarized in a series of technical reports. All water quality parameters measured met Provincial Water Quality Objectives.

Niagara River: A trace contaminants survey of the Niagara River conducted in late 1979 revealed the presence of heavy metals, pesticides, PCBs and mirex in the river's ecosystem. Water samples were in compliance with drinking water criteria, but at some locations, objectives for the protection of aquatic life were exceeded for PCBs, DDT, BHC, dieldrin, heptachlor epoxide, endrin, thiodan and/or cadmium. Sediment samples at certain sites contained high concentrations of PCBs, arsenic, chromium, copper, lead, mercury, nickel and/or zinc (above MOE dredge spoil disposal criteria). Analyses of suspended sediments indicated that the Niagara River is a continuing source of a number of organics and metals to Lake Ontario.

Lake Ontario: Highly significant downward trends in total phosphorus levels have been documented in Lake Ontario nearshore for the 1967-79 period. The rate of decrease has varied from 3.1 ug/L/yr in the Oakville to Toronto area to 2.3 ug/L/yr in the Toronto to Ajax area, 2.0 ug/L/yr in the Niagara to Jordan Harbour area and 1.3 ug/L/yr in the Jordan Harbour to Oakville area. It is significant that the greatest improvement was recorded along the highly developed sector west of Toronto where phosphorus inputs were highest and where, proportionally, the greatest degree of phosphorus reduction has occurred. Further monitoring is necessary to confirm whether the present control programs will lead to continuing further improvements in water quality.

In Toronto Harbour, bacteriological levels are continuing to decline, likely in response to remedial measures involving sewer separation and trunk sewer installation. For instance, total coliform levels in the Toronto Harbour decreased by 40 per cent from 1978.

A new problem area identified in 1977 near Clarkson and associated with Gulf Oil discharges showed considerable improvement. A comparison of 1977 with 1979 phenolic loading data revealed a substantial decrease in the size of the non-compliance zone, which is directly attributable to significant reductions of phenolic loads discharged by the plant.

Current metre measurements were continued in Toronto Harbour to better define the exchange mechanisms; measurements in the Eastern and Western Gaps have indicated that the flow is layered during the Summer months. Preliminary tests were carried out with a two-dimensional model to show the extent of effects of stormwater inputs to the Harbour from the city waterfront sewers.

Artificial re-aeration of Hamilton Harbour was discontinued, and subsequent observations indicated no significant differences in the oxygen concentrations. Measurements show that substantial quantities of oxygen are being introduced into the deep waters of the Harbour through the Burlington Ship Canal, but increases in the oxygen concentrations occur only temporarily. Investigations of the compounds and processes affecting the oxygen levels suggest that the main sinks for oxygen are the oxidation by bacteria of organic carbon, reduced sulphur and nitrogen compounds. Development of statistical and block water quality models, linking the loadings to the Harbour with oxygen depletion, was commenced.

A study of the behavior of the thermal plume from the Pickering Nuclear Generating Plant during the winter months was planned and implemented in co-operation with Ontario Hydro and the National Water Research Institute. The aim of the study is to define the main direction of the plume, to show whether it follows the shore or disperses into the lake, and to define the effects of the plume on the movement of pollutants from the nearshore region into Lake Ontario.

St. Lawrence River: Bio-accumulation of persistant toxic substances was investigated by the Ministry in the Cornwall-Massena area of the St. Lawrence River. Samples were also taken in areas of discharges to document the relative magnitude of input sources. Acting upon the Ministry's recommendations, New York State has undertaken studies to ascertain specific U.S. sources and initiate remedial measures related to elevated levels of PCBs found by the Ministry at the mouth of the Grass River and in the vicinity of the General Motors and Reynolds Metals outfalls along the U.S. shore. Further Ministry studies are planned to investigate levels of PCBs and phenols in the Domtar effluent in Cornwall.

Pollution from Land Use Activities Reference Group

Branch input to the Pollution from Land Use Activities Reference Group (PLUARG) study was completed with the submission of technical reports to the International Joint Commission on data summaries of streamflow and water quality, data methodology and the effect of some waste disposal practices on Great Lakes water quality.

Inland Lakes

1979-80 was the final year in which the Branch carried out intensive field investigations in seven lakes in the Sudbury area. The acidic control lake, Clearwater Lake, was monitored for the seventh consecutive year. This represents the world's longest continuous monitoring program of an acidic lake. Two of the lakes limed in 1973 to 1975 still had pH levels greater than 6.0. Changes in the biota were still occurring in these lakes, indicating that unassisted recovery rates may be very slow. The pH of Lohi Lake has fallen from 6.5 to under 5.0 since 1975 lime additions, while metal levels have increased. Phytoplankton and zooplankton changes are lagging behind chemical changes in this lake.

Results of experimental low and high level fertilizer additions indicate that acidic lakes can develop symptoms of eutrophication if nutrients are available. Hydrologic and chemical budgets were being constructed for five lakes and are to be used to model rates of metal and acid movement through the lakes, and provide information required to predict the duration of treatments and rates of acidification of lakes or rates of recovery if acid inputs are reduced.

Acidic precipitation continued as a major program in 1979-80, after the first Ministry reports of the problem in 1977. Studies on the deposition of heavy metals such as copper, nickel and lead associated with acid rain were also undertaken. Detailed limnological studies on some 20 lakes centred in Muskoka-Haliburton were continued on a year-round basis. In addition, the tabulation of data from surveys of hundreds of lakes across Ontario was begun. This information is expected to aid in the identification of areas sensitive to acid precipitation.

Thirty acid-sensitive lakes were surveyed in 1979-80 to establish macrophyte and moss specie composition and abundance and the metal content of the vegetation. Information from Scandinavia suggests regression of classic soft water plant communities with concurrent invasions of spagnum mosses and fungi in acidified lakes. Although sphagnum infestations of Ontario lakes have not reached Scandinavian proportions, these mosses were found in 58 per cent of the lakes surveyed, an indication they are common in acidified lakes.

The Branch collected yearling yellow perch from 14 lakes in the Muskoka and Haliburton area affected by acidification to varying degrees. Mercury accumulations in fish increased with greater acidity, but body burdens of mercury were also directly related to the watershed area. A contract study through the Ontario Research Foundation supported this observation by indicating significant atmospheric inputs of the dry vapor phase of mercury in the study area.

Analysis of the same fish for PCBs indicated increased levels in fish for lakes where adjacent roads were oiled for dust control. Further investigations confirmed that even low-level PCB contamination of road oil was leached into nearby lakes and accumulated in fish. The allowable level of PCBs in road oil is being reviewed.

A project to establish the potential of wetlands for year-round sewage treatment in Ontario was continued in 1979-80. Instrumentation of a small natural marsh plot adjacent to the Brantford Sewage Treatment Plant was completed, and collection of background data was initiated in the Spring of 1979. A contract was awarded for the construction of a multi-celled artificial marsh system adjacent to the Town of Listowel's existing sewage lagoons. Construction of this facility was started in October 1979.

The Lakeshore Capacity Study is a multi-ministry co-operative project to develop predictive models concerning the effects of human development on lakes and their watersheds, particularly the capacity to accept recreational development. Compilation of results continued in 1979-80 and preliminary analyses showed that some fraction of the nutrients from human activities on the lakeshore entered the lakes and affected water quality.

The phosphorus removal programs at Gravenhurst and in the Penetang-Midland area produced slightly improved water quality conditions, while in the Bay of Quinte total phosphorus levels were similar to those measured in 1978-79. The destratification projects on Heart and Thompson Lakes were monitored routinely, and a new hypolimnetic aeration study was initiated on Eaton Lake. The two man-made lakes in the City of Mississauga, Aquitaine and Wabukayne, were also monitored. Based on information collected from Lake Aquitaine, modifications are being completed on the Lake Wabukayne siltation basin to improve water clarity conditions.

Analyses of yearling yellow perch collected from the Wabigoon-English River System indicated that mercury contamination appears to be restricted between Dryden and Ball Lake. Data also suggested that mercury levels may be declining in yearling perch. Monitoring will continue in order to more clearly establish trends.

Water Management

The Water Resources Branch developed and co-ordinated a project to facilitate implementation of the document "Water Management: Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment". This effort included preparing policy interpretations to assist Ministry staff in applying the revised policies, holding a series of seminars with regional and head-office staff and co-ordinating and participating in the work of a steering committee and five working groups charged with developing detailed implementation procedures.

Branch staff participated in the five working groups of the Water Management Implementation Steering Committee. The operation of the Permit to Take Water (PTTW) Program was included in the mandate of Working Group IV. Possible legislative changes to Section 37 of The Ontario Water Resources (OWR) Act were documented for review along with finalized procedures to deal with possible land subsidence as a result of permitted takings of water. At year-end, the Branch was assisting in the clarification and definition of Ministry groundwater quality management policy and in the preparation of a manual to direct Ministry responses to regulated and unregulated sources of groundwater contamination.

Regulation of the well-drilling industry continued with the issuing of 491 drilling and boring contractor's licences (34 to contractors being licenced for the first time). Three contractors were prosecuted and two were convicted for infractions under Section 40 of The Ontario Water Resources Act. More than 12,000 water-well records were received for processing by the Branch from water-well contractors in the Province. Two training seminars were sponsored in Kitchener and Sudbury for water-well drilling contractors and their employees.

Proposed amendments to Section 39 and 40 of The Ontario Water Resources Act were finalized. The amendments will allow for upgrading of the well construction industry.

The Ministry distributes information widely on trace contaminants such as mercury, PCB, Mirex and DDT found in sport fish. During 1979-80, the Ministry issued six Environmental Health Bulletins containing new or updated information on contaminants in fish from 317 waterbodies throughout the Province. In April 1979, the second annual edition of "Guide to Eating Ontario Sport Fish" was published for Northern Ontario, Southern Ontario and the Great Lakes. The booklets contain information on 43,000 fish taken from 625 waterbodies. Approximately 200,000 copies were distributed free of charge.

The Fish Contaminant Information Program is a co-operative undertaking of the Ministries of Natural Resources and Environment. The Ministry of Natural Resources collects the fish. The Laboratory Services Branch of the Ministry of the Environment carries out the chemical testing and statistical data analysis. The Water Resources Branch co-ordinates the entire program and prepares the information for the Environmental Health Bulletins and the annual "Guide" books. Medical advice for consumption guidelines is provided by the Ministry of Labour.

The Proposed Model Policies for Urban Drainage Management, previously developed under the Canada-Ontario Agreement on the Great Lakes Water Quality, were distributed for review to other ministries and government agencies, representative organizations for municipal engineers and engineering consulting firms. A final set of the proposed policies was being prepared for publication under the Canada-Ontario Agreement at year-end. The program for the Rideau River Stormwater Management Study, commenced in 1978-79, was continued and the final study proposal was presented for Provincial Lottery funding. Phase I of the program was initiated and assigned to a consultant to evaluate the existing problems and provide recommen-

dations for feasible stormwater management practices.

Activities related to the Grand River Basin Water Management Study were continued with the completion of the bulk of the field investigations. The study has been carried out under the direction of the Grand River Implementation Committee, consisting of representatives from seven ministries (Agriculture and Food, Environment, Housing, Industry and Tourism, Intergovernmental Affairs, Natural Resources, Treasury and Economics) and the Grand River Conservation Authority.

Information was assembled on water quality, aquatic plants and algae, hydrology and user practices for extensive areas of the basin. At year-end the information was being used to evaluate water resource conditions and to predict the effects of development and various water management options through the use of hydrologic, biological, water quality and economic systems models. The Branch and participating groups in the Ministry of Natural Resources and the Grand River Conservation Authority were applying the models to evaluate water management plans to meet needs for flood damage reduction, water quality and water supply in the Grand River basin. The biological model being developed by Branch staff will predict changes in oxygen levels in the rivers caused by the growth of aquatic plants and algae.

The Branch continued collecting continuous data on dissolved oxygen and temperature at eight sites in the Grand River basin. The data are used primarily to verify a continuous simulation, water-quality model.

Staff contributed actively to a public consultation program to inform municipal representatives and officials and the public about water management conditions and practices in the basin. Significant public input to the study was received through the activities of four public consultation working groups representing different parts of the basin.

The inventory of groundwater resources in the Grand River basin was concluded by the Branch. The final report addresses general aspects of hydrogeology and future development of groundwater throughout the basin and provides in-depth analysis of groundwater potentials for water supply for 23 communities, including the Regional Municipality of Waterloo.

In co-operation with the conservation Authority, development of a continuous streamflow data base was completed for the basin. Rainfall patterns were examined and flow frequency analyses were conducted for the evaluation of reservoir operations and prediction of storm runoff.

The linear programing economic screening model was finalized and applied to the Grand River basin. This model will be used for the evaluation of various water quality, water supply and flood control measures, and for the evaluation of recommended water management plans.

Aspects of waste disposal continued to involve the Branch. At the request of the Regional offices, the Waste Management Branch and the Environmental Approvals Branch, hydrogeologic input was provided towards the Ministry's position on a significant number of proposed, active and closed disposal sites. In the area of radioactive waste disposal and radioactive contaminants, the Branch participated in the hearings on the proposed refinery at Port Granby and the mine expansion of Elliot Lake. Specific problems associated with tailings at the Nordic Mine and with radon gas in March Township were addressed. Other requests for assistance with waste disposal included problems associated with the CDL brine disposal wells in Southwestern Ontario, the Appeal Board Hearing on the proposed landfill at Maple, the Assessment Board Hearing for the industrial waste disposal facility at Nanticoke and the appeal against the Ministry's Order for the installation of gas control devices at the Sabiston landfill site. Increased public interest in the area of waste disposal resulted in a corresponding increase in expertise available to participants at hearings and in the technical complexities of the proposals and the arguments against them.

The Branch was a major contributor to the preparation of the interim guidelines for landfill gas control. The Branch also provided guidance to the consultant retained to investigate landfill gas migration and prepared input to the formulation of regulations dealing with this problem.

A closer liaison was formed, partially through technical seminars and discussions, between the Branch and the Ministry of Transportation and Communications (MTC) to consider salt contamination resulting from highway de-icing practices. Procedures were formalized for direct resolution of contamination problems by MTC/MOE Regional Personnel.

The Branch is a major contributor to the Ad-Hoc Committee on Underground Storage of Petroleum Products in its interface with the Ministry of Consumer and Commercial Relations (MCCR) and industry to establish some control over buried storage tanks. A proposal by industry for the replacement of unprotected tanks was critically reviewed and modifications were suggested to MCCR. This included provision of a map of the Province indicating priority areas for tank replacement on the basis of environmental sensitivity to contamination.

In association with the Municipal Engineers Association/Ministry of the Environment (MEA/MOE) Course Development Committee, the Branch assisted in preparing sections of a manual that deal with hydrogeology for the Disposal by Landfilling course. The course is intended to assist administrators and operators in understanding the importance of landfilling in a proper manner.

Other activities included review and comment on various documents submitted to the Branch, including drafts of Bill 24, drafts of MNR Class EA for landfills, drafts of proposed landfill guidelines and regulations and a brief to the Minister on the deep-well disposal of liquid industrial wastes.

Water Resources Inventories

The results of the "Water Resources of the South Nation River Basin" in the eastern part of Ontario were published (Water Resources **Report 13**). The report deals with the occurrence, distribution , quantity, quality and the use of surface and ground waters within the basin.

This report will form an inventory base for the provincial interministerial committee that is examining ways of resolving problems of flooding, water supply and waste assimilation in the basin. The water resources study of the Holland and Black basins was completed. The study outlines surface and ground water resources in the Oak Ridges area north of Toronto and provides data for the Regional Municipality of York's official plan. A similar study in the Humber River and Don River basins was initiated and field work was completed.

The results of water resources inventory studies in the Lake Ontario drainage basin were published in three separate reports:

(1) "The Hydrogeology of the IFYGL Forty Mile and Oakville Creeks Study Areas" (Water Resources Report 5b);
(2) "The Hydrogeology of the IFYGL Duffins Creek Study Area" (Water Resources Report 5c);
(3) "Geology and Water Resources of the East and Middle Oakville Creeks, IHD Representative Basins" (Water Resources Report 12).

The three reports summarize field studies undertaken by the Ministry as part of the International Hydrological Decade (IHD) and the International Field Year for the Great Lakes (IFYGL)—a joint Canadian and United States contribution to the IHD. Extensive hydrogeologic field work was carried out under both programs.

The Branch continued the groundwater probability mapping program in 1979-80 and the map "Region of Peel, Groundwater Probability" was published (Water Resources Map 3128). Mapping of the northern portion of the County of Simcoe was continued.

Map S100, "Hydrogeologic Environments and the Susceptibility of Groundwater to Contamination", was published. The map contains information on the susceptibility of groundwater (in Ontario) to contamination from surface or near-surface sources. This publication is only the first cursory stage in dealing with the inter-relationships of hydrogeology and hydrochemistry, and many complex environmental factors were generalized in order to present information for general planning purposes.

Regional liaison meetings concerning all surface and groundwater networks resulted in the following benefits and improvements:

(1) All stations in the provincial hydrometric networks (streamflow, observation well and water quality) were reviewed relative to Ministry needs. New stations were identified to eliminate deficiencies and other stations terminated to eliminate redundancy. Overall, a significant reduction in analytical test requirements resulted from the modifications to the provincial water quality network.
(2) Enhanced monitoring for toxic contaminants was initiated at selected stations within the provincial water quality network.
(3) An enhanced monitoring program was implemented on 13 high priority tributaries to the Great Lakes with sampling frequency being keyed to hydrologic events.
(4) The groundwater quality pilot study was expanded to measure the variability of water quality constituents under a variety of hydrogeologic conditions.
(5) The water quality flagging program was made operational. This program compares existing water quality to provincial water quality objectives and summarizes the results.

Cartography and Drafting Services

In servicing the cartographic, drafting, graphic artwork and reproduction needs of Ministry programs, Branch staff completed 307 multi-color and monocolor maps and prepared 1,058 drawings, figures and illustrations.

Engineering, Scientific, Technical and Administrative and Data Services

Geophysical surveys involving seismic, resistivity, gravity, well-logging and VLF methods were utilized in groundwater contamination problems, for groundwater development projects and for evaluation of landfill sites. Specialized assistance was provided to the Alberta Department of the Environment regarding the application of geophysics to groundwater supply problems in Alberta. The soils laboratory continued to undertake a variety of analyses on soil samples submitted from various sources within the Ministry.

The Branch provided technical assistance to the Environmental Approvals Branch by reviewing and commenting on more than 50 environmental assessments, class assessments and environmental assessment guidelines. Most notable among the full environmental assessments reviewed was the Grand River Conservation Authority's "Environmental Assessment of Water Control Structures in the Grand River Basin".

The Branch helped examine waste assimilation problems on the Spanish River for Northeastern Region and on the Wabigoon River system for Northwestern Region. Waste assimilation analyses were also carried out for the Southwestern Region in updating the results of the original Thames River model analyses at Woodstock. A Stream Water Quality Assessment Procedures Manual, outlining procedures for field data collection and mathematical analysis of waste assimilation problems, was prepared and released to the Regional offices. The River Systems Newsletter was initiated and the Fourth Annual Water Resources Seminar on surface water quality management was held in co-operation with the Northeastern Regional Office.

The Branch continued development and testing of mathematical modelling techniques to describe effluent mixing zones in rivers and to predict critical concentrations of conservative and non-conservative substances. Stormwater management modelling packages were

distributed to municipalities and consulting firms and services were provided in their usage and application. The MOE Dynamic Water Quality Model was modified to include the new MOE stream biomass model, ECOL and applications were commenced for the Grand River basin study to show the effects of various point and non-point sources of pollution on the stream water quality.

A major program was initiated in conjunction with Environment Canada to identify the presence of solvent extractable organics in the St. Clair River and in local industrial effluents. Previous studies concentrated on volatile compounds. Rainbow trout were exposed to river water in on-shore tanks to identify bio-accumulative compounds and to determine the biological activity of those compounds through their rates of uptake and clearance.

Regulatory bio-assay testing of industrial effluents, also supported by Environment Canada, are to be concentrated on toxicant identification and significance to provide recommendations for waste treatment. The status of selected pulp and paper mills and the refinery industry in Ontario was reviewed with respect to effluent toxicity.

A compilation of aquatic toxicity test methods was assembled which covers procedures for fish and daphnia toxicity testing, fish reproduction tests, fish tainting evaluations, industrial waste investigative testing, data handling and interpretation and continuous flow-dosing apparatus and control systems.

The Administrative Group continued to provide word processing, reception, filing and mail services as required. The capacity for bilingual word processing was investigated, developed and was operational at year-end. It was further determined that facilities exist for interfacing with type-setting computers. The Data Services Group continued to maintain the Branch's three storage and retrieval systems—Water Well Records, Great Lakes Water Quality Data, River and Streams Water Quality Data—at the normal rate of 12,000 to 14,000 records per system per annum.

The Administrative and Data Section Supervisor served as Branch representative on the LIS User's Committee and as a member of the Subcommittee charged with developing a standard sample submission document. The acquisition of suitable data manipulation facilities was co-ordinated with Branch users and representatives from the Downsview Computing Centre and was operational at year-end.

Pollution Control Branch

Director: K.E. Symons

The Pollution Control Branch is primarily responsible for the planning of environmental control programs and development of associated legislation, regulations and guidelines to control the emission of contaminants and the quality of drinking water. Supplementary functions include applied research, technology transfer, technical advisory service and delivery of certain aspects of the pesticides and noise control programs.

Municipal and Private

The Municipal and Private Section is responsible for policy development and program audit in connection with municipal water supply, pollution control and private sewage systems.

The **Municipal Sewage Unit** prepared draft policy and guideline statements governing the use of pressure and vacuum sewer systems for the collection and transmission of municipal sewage, and draft guidelines for the spray irrigation of sewage plant effluent on recreational lands. Other policy and guideline packages, either under preparation or close to finalization, included "Control of Combined Sewer Overflows and Wastewater Treatment Plant By-passing", "Energy Conservation in Sewage Treatment", "Application of Wastewater Treatment Plant Effluents to Agricultural Lands", "Disinfection of Wastewater" and "Wastewater Treatment Plant Sampling Procedures".

Unit staff developed a program to ensure the safe design, operation and maintenance of digester gas systems in plants owned or operated by the Ministry. This program will also be made available for implementation at municipally operated treatment plants.

The Unit assumed a lead role in setting up performance criteria for sewage works in connection with implementation of the Ministry's new water management policies. The criteria will govern incorporation of effluent requirements for new or expanded works into Certificates of Approval.

Unit staff were actively involved in local, interministerial, national and international committee work. Notable examples included participation on the I.J.C. Phosphorus Management Strategies Task Force; chairing of the Federal-Provincial Task Group developing national policies and guidelines on disinfection of sewage plant effluents; and representing Ontario on the Great Lakes and Upper Mississippi River Board-Sewage Collection and Treatment Committee.

The Province is responsible for administering federal grants to assist in the construction of municipal water and sewage services under the Community Services Contribution Program. The unit continued to co-ordinate the program within the Ministry and provide liaison with the federal government and other participating provincial ministries.

The Unit continued monitoring and evaluation of the phosphorus removal program in wastewater treatment plants. Assistance to Regional Staff in implementing the programs was also provided. In 1979, 220 wastewater treatment plants reduced inputs of phosphorus to our lakes and rivers by an estimated 7,000 tons.

The Municipal Sewage Unit is responsible for identifying and quantifying waste from municipal sources discharging into the Great Lakes from Ontario. All waste loadings, together with planned remedial programs and the abatement status of Ontario

municipalities discharging into the Great Lakes, are reported yearly through the I.J.C. Water Quality Board Annual Report.

The Unit concentrated considerable effort on the urban drainage management and sewage sludge utilization programs. A draft policy and guidelines package on urban drainage management was completed. A proposal was developed for an inter-agency committee to be charged with reviewing policies and co-ordinating implementation procedure development. In addition, staff members actively directed and participated in the Rideau River Stormwater Management Program, a large-scale urban drainage management demonstration activity. Implementation of the Guidelines for Utilization of Sewage Sludge on Agricultural Lands was initiated with implementation being co-ordinated jointly by the Ministry of Agriculture and Food and the Ministry of the Environment.

The Unit co-ordinates the development and operation of the computerized Management Information System. In conjunction with regional representatives from the Utility Operations Section, work was completed on a performance data collection system for Ministry-operated water and wastewater utilities. All Ministry-operated works were reporting to the system in 1979-80. Output reports on the annual and monthly operating data as well as summary reports on the plant capabilities, efficiencies and loadings were made available to the Regions on a quarterly basis. Work was begun on data collection for municipally operated utilities. When this work is complete, reports on utility performance for the entire Province will be produced. A complete listing of all water and sewage works in Ontario, as of December 31, 1978, was issued.

The **Private Sewage Unit** prepared seven Notices for distribution to agencies administering Part VII, The Environmental Protection Act, 1971. The Notices are designed to keep MOE and Ministry of Health personnel up-to-date concerning legal, technical and financial aspects governing private sewage systems. Six chapters of the Manual of Policy, Procedures and Guidelines for Private Sewage Disposal Systems were updated and copies sent to field offices.

A major project was initiated to revise Ontario Regulation 229/74 and to metricate the values. The Unit worked on the development of Guidelines for Septage Disposal, which are to be finalized in 1980-81.

The Unit prepared a report outlining four possible options for the future of the Boating and Marina Program. Meetings were held with regional personnel to discuss matters of mutual interest and concern. Information was also prepared for a press release on the program and for an open letter sent to marina operators thanking them for their continued support and co-operation. Summary reports were prepared on regional programs for ice-oriented activities and boating and marina operations.

MOE staff attended the Montreal Boat Show for the first time to answer inquiries on the Ontario regulation governing the discharge of sewage in and from pleasure craft.

The Advisory Committee on Private Sewage Disposal Systems held nine meetings and discussed 24 main subjects dealing with Part VII (The EPA, 1971). A Sub-committee was appointed to explore and report on all aspects of the licencing of contractors involved with the construction and/or emptying of sewage systems. By year-end the task had been essentially completed and a report prepared outlining three possible options.

The **Municipal Water Unit** co-ordinated the review of the Ontario Drinking Water Objectives; the revised document is to be published in 1980-81. The Unit also co-ordinated revision of the chlorination bulletin which is to be published in 1980.

The unit continued to serve on the Ontario Section AWWA Technical Committee, the Canadian Standards Association Sub-committee on Pressure Pipe, the MOE/Ministry of Health Committee on Household Water Treatment Devices and the Great Lakes Upper Mississippi, River Board of State Sanitary Engineers (Ten State) Standards Water Committee. Guidelines for ozone and chlorination disinfection devices were prepared by the latter committee. The Canadian Standards Association (CSA) canvassed opinion on the need for standards for household treatment devices; however, insufficient financial support prevented the CSA from starting on the standards.

The Unit reviewed the quality control and transportation of water treatment chemicals. Some difficulty was experienced in obtaining analyses of concentrated chemicals because of corrosion problems with the analytical equipment. Work in this area will continue.

The Unit reviewed the sampling requirements for drinking water quality and prepared a report with estimates of the number of analyses required to monitor important parameters.

Noise Pollution Control

The Noise Pollution Control Section received 369 new noise complaints in 1979-80. Complaints due to air conditioner noise were investigated in 40 instances, while 203 industrial noise complaints were reported and investigated.

Complaints of excessive noise resulted in investigations in 86 different communities throughout the Province. Prosecution of one firm was initiated for the excessive emission of industrial noise.

Several blasting noise complaints were under continuing investigation. Provincial officers were called upon to provide expert testimony in several actions launched by various municipal and private parties. A conviction registered under the Town of Napanee Noise Control Bylaw was appealed. Similarly, a Court decision on a charge involving noise from a private gun club in Uxbridge was being appealed by the Crown at year-end.

Fifty noise control bylaws pursuant to Section 95a of The Environmental Protection Act have been adopted by municipalities and approved by the Minister of the Environment. In support of this program, the fifth year of the Environmental Acoustics Technology training session sponsored by the Ministry was successfully completed. Acoustics IV, the highest course level in the

noise control training series, was finalized for presentation in May 1980.

The Section continued to provide technical comment on new land-use proposals and new industrial projects in the noise impact assessment program. Increasing attention was given to assessing class environmental impact statements, intergovernmental studies on transportation noise problems and use of lands subject to Ministerial zoning orders.

Pesticides Control

The Pesticides Control Section carries out its programs under The Pesticides Act, 1973, and Ontario Regulation 618/74. The Section promotes a balance between pesticide use and environmental protection. The Section classifies pesticide products, licences exterminators and vendors, issues permits for specific pesticides and uses, and provides training courses, seminars, study guidelines and material, including fact sheets, for industrial and commercial applicants for licences. The public is assisted through the dissemination of publications, especially at shows and fairs.

As part of its education function, the Section was involved in a considerable number of seminars and meetings, designed to assist applicants for licences and to keep established licencees up-to-date on materials, uses and safety procedures. Five major seminars covered landscape and plant maintenance, structural pest control, termite control, the food industry and grain elevator problems. In addition, a large number of courses were arranged in collaboration with other organizations, for those wishing to enter the pest control industry.

During 1970-80, the Section conducted 2,932 examinations and issued 7,435 exterminator licences, 1,183 operator licences and 3,945 vendor licences. The Section also issued 162 permits for the use of restricted pesticides on land, 420 permits for the application of pesticides to water and 232 permits for structural extermination.

The Summer of 1979 was the fourth consecutive one in which municipalities south of a line drawn between Sarnia and Toronto were urged to participate in mosquito surveillance programs. This area was designated by the Ministry of Health as a high-risk zone after 67 cases of St. Louis encephalitis were reported during the Fall of 1975. In 1979, due mainly to cool weather in the late Summer, mosquito populations remained relatively low and no human cases of encephalitis were reported. As a consequence, spraying activity was reduced.

Research continued to be conducted at selected water sites throughout the Province to determine the efficacy of a number of unregistered aquatic herbicides for a variety of plant problems.

The termite control program is directed primarily towards providing technical and financial assistance to municipalities experiencing problems with infestations of this insect. Public education, in the form of talks to ratepayers groups, schools and universities, is also a large part of the program. Surveys were carried out in all Metropolitan Toronto boroughs and in 15 other communities. The Section conducted a termite survey using wooden bait blocks and visual inspection. In all, 3,000 bait blocks were examined and various degrees of activity were found. In addition, a research program was continued in Kincardine and Guelph involving the planting of 9,000 blocks.

Grants approved for chemical treatments and/or wood-soil contact removal for the control of termites were as follows:

MUNICIPALITIES	GRANTS
Town of Kincardine	35
Town of Leamington	2
Village of Elora	3
City of Guelph	7
Borough of East York	56
Borough of Scarborough	53
City of Toronto	238
Borough of Etobicoke	6
Town of Fergus	7

Altogether, 407 treatments were successfully completed and grants totalling $199,912 were paid to homeowners.

Research and Development

The Co-ordination Section is primarily responsible for internal and external co-ordination and liaison in matters related to research and for administration of the research facility.

The Supervisor chaired the Ministry's Research Advisory Committee and maintained liaison with other research groups in the Ontario government through the Research Administrators' Committee and with the federal government through the Canada-Ontario Agreement. During the year, contact was maintained with the United States Environmental Protection Agency, particularly their drinking and wastewater research groups in Cincinnati, Ohio. Through membership on the Research Committee of the American Water Works Association, the Section participated in the Association's research program selection.

The Section administers the Provincial Lottery Program initiated in 1977. Eighteen health-related environmental projects were funded at a cost of $1.8 million in 1979-80. Project subjects included PCBs, noise, phosphorus removal, ozone, disinfection, organics and leachate attenuation.

Applied Sciences

The Applied Sciences Section is an engineering group carrying out investigations and reporting on innovative concepts relating to environmental protection and enhancement. Eight studies were under way at year-end, primarily in the fields of improved construction techniques for municipal utilities in cold regions and large-scale private waste disposal systems. Four reports and four papers were prepared during 1979-80.

Wastewater Treatment

The Wastewater Treatment Section advances the quality of municipal effluent treatment in Ontario by

maintaining and upgrading the level of expertise in treatment technology through developmental research and by providing advice and assistance to planning, control and operational staff of the Ministry, municipalities and industry. In recent years, increasing emphasis has been placed on urban sources of wastewaters in addition to municipal sewage.

The Section maintains an analytical laboratory and the Ontario experimental Facility, a 5.0 MIGD activated sludge plant for use in developmental research work and operator training.

At year-end, the Section was involved in a total of eight research projects concerning municipal effluents, including ultra violet disinfection, aerobic digestion and organics removal. The Section was also involved with two major environmental studies on the Rideau and Grand Rivers, the Cornwall study for the development of a combined sewer overflow/urban drainage policy and a chlorine use inventory related to disinfection policy development.

The Section advised 26 municipalities throughout the Province on industrial waste treatability, new plant start-up, performance evaluation, operational problems and capacity evaluation. Section staff assisted in the review of design proposals for approximately 15 facilities.

The Section participated in the Activated Sludge Workshop, the Basic Sewage Treatment Course, the Chlorine Workshop, the Digester and Primary Treatment Course, the Sampling and Monitoring Course and the Nitrification Workshop within the Ministry's training program.

Contingency Planning

The Contingency Planning Section is responsible for the Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials, for assisting municipalities and industry in the development of their respective spill contingency plans, for assisting in related response training and for the maintenance of spill statistics.

During 1979-80, the Section received reports on 527 spill incidents. Of these, 353 involved the loss of oil; 81, the loss of liquid or solid hazardous materials; 18, the loss of gaseous materials and 75, the loss of other contaminants.

The Section participated in the preparation of Bill 24, an amendment to The Environmental Protection Act, 1971, which received third reading on December 11, 1979. The amendment increases spill notification requirements, creates clean-up and restoration duties for the owner and person in charge of spilled contaminants, increases liability, increases incentive for preventative programs, establishes a right for municipalities to respond to spills, and provides additional authority for the Minister to order or undertake counter-measures.

Water Technology

The Water Technology Section conducted research studies concerning ozone, trace organics (including haloforms), iron and manganese treatment, asbestos, effect of treatment processes on treated quality, distribution systems and micro-macro-biological water quality.

The Province-wide survey on trace organic work was expanded to include 50 new locations. Locations previously monitored with yearly averages of over 30 ppm were continued; locations with yearly averages less than 30 ppm were removed from the survey. No locations in Ontario exhibited haloform concentration levels above those maximum acceptable concentrations quoted in the recently published federal document "Guidelines for Canadian Drinking Water Quality, 1978". Projects funded under the Provincial Lottery Program were concerned with alternate disinfection procedures at Belleville and the use of granular activated carbon to reduce haloforms in treated water at Brantford. The final report for the Belleville project was released.

A study at a Metro Toronto plant investigated the effect of eliminating pre-chlorination on treated water haloform levels and bacteriological quality: haloform levels were marginally lower and finished water bacteriological quality, as measured by standard techniques, remained unchanged.

The Lottery-funded health-related research project on the use of ozone as an alternative disinfectant was continued.

The asbestos monitoring program for all municipal water supplies was continued; the levels counted were low or below the detection limit.

Technical advisory work was carried out concerning new water plant commissioning, plant up-rating and plant operational and technical problems.

Environmental Approvals Branch

*Director: D.P. Caplice

The Environmental Approvals Branch provides an approvals function for companies, individuals and governmental agencies requiring approval for their projects under The Environmental Assessment Act and sections of The Environmental Protection Act and The Ontario Water Resources Act.

Environmental Assessment

The Environmental Assessment Section is responsible for managing the implementation of The Environmental Assessment Act and co-ordinating the review of projects coming under the Act. The Environmental Assessment Act is a decision-making tool in which the proponents of major projects demonstrate in a public document how and why the project is needed, and how detrimental environmental effects caused by the project during its construction, operation and retirement, will be lessened or eliminated. At year-end, the Section was

in the process of finalizing details involving implementation of the Act to the municipal sector and furthering analysis as to how the Act will be applied to private sector undertakings.

The Section continued co-ordination of the Ministry's submissions to the Royal Commission on Electric Power Planning; continued co-ordination of provincial government input to the Federal Environmental Assessment and Review Process hearings on the Eldorado Nuclear Ltd. uranium hexafluoride processing plant at Port Granby; continued participation in the hearings by the Environmental Assessment Board concerning uranium mining expansion plans by Denison Mines and Rio Algom Mines at Elliot Lake.

Concerning projects under The Environmental Assessment Act, Section staff continued to prepare environmental assessment guidelines, consult with proponents on the form and content of environmental assessments, review draft environmental assessments and prepare formal reviews of environmental assessment documents.

During the year, 18 reviews of environmental assessments were completed and 11 undertakings were given approval to proceed. Twenty-five formal submissions and 29 draft submissions were received under The Environmental Assessment Act. Among the undertakings given approval to proceed were those dealing with highway widenings (Ministry of Transportation and Communications); Welland and Port Colborne Water Treatment Systems (Ministry of the Environment); the Deer Lake Remote Airport (MTC). Among the submissions received for formal review were Generating Facilities on the Lower Musquash River (Orillia Water, Light and Power Commission); Montrose Dam and Reservoir (Grand River Conservation Authority); commuter stations and facilities (Toronto Area Transit Operating Authority); sewer systems and water systems (MOE); and the QEW between Burlington and Hamilton (MTC).

Section staff consulted on the Upper Thames Conservation Authority's proposed Glengowan flood control dam; the Inco hydro-electric power dam on the Spanish River; the Onakawana Development Limited lignite mine on the Ontario Northland Railway line south of Moosonee. They also reviewed 78 Ministry water and sewer projects conditionally exempted under Section 30 of The Environmental Assessment Act in October 1977 when the Act came into effect. Exemptions were granted because the projects were too far advanced to be properly assessed under the Act or too small to be of major environmental consequence.

Section staff addressed or otherwise participated in 80 illustrated lectures on The Environmental Assessment Act as well as at numerous conferences and seminars. They also supervised 18 Experience '79 projects.

Industrial Approvals

The Industrial Approvals Section processed 12 per cent more applications for Certificates of Approval in 1979-80 than in 1978-79. Again, considerable time was spent providing technical expertise to regional staff on pollution control methods and equipment, commenting on preliminary proposals from industry and preparing responses to public inquires.

Many applications for Certificates of Approval were more complex in nature because of increased energy conservation requirements, which resulted in new technological proposals being put forward for both process and control equipment. Approvals staff attended courses and seminars as required to keep pace with these developments. The number of waste disposal applications increased by 76 per cent due to initiation of the disposal site inventory program.

The Section continued to assist the Legal Branch by providing technical information and testimony as expert witnesses at legal prosecutions. During 1979-80, six convictions were obtained under Section 8 of The Environmental Protection Act, 1971. Section staff also spent considerable time preparing for and attending public hearings.

Major projects requiring staff input were put forward by St. Lawrence Cement in Mississauga, Eldorado Ltd. in Port Hope, General Motors in Oshawa, Prestolite Batteries in the Town of Vaughan, Canada Metals in Toronto, Pratt and Whitney in Malton, Consumers' Glass in Milton, Stelco in Nanticoke, Dofasco in Hamilton, Union Carbide in Welland, Abrasives Industries in Niagara Falls, Ontario Paper Co. in Thorold, Cyanamid Inc. in Niagara Falls, Columbia Carbon in Hamilton, Inco in Port Colborne, uranium mining industries in the Elliot Lake area, the pulp and paper industry in Northern Ontario and Ford Motor Co. in Windsor.

The cost of control equipment installed, according to the total number of applications processed, amounted to $101,471,560 for water applications and $78,467,130 for air applications.

APPLICATIONS PROCESSED*

April 1, 1979 - March 31, 1980

	Received	Approved	Cancelled	Denied
Air	727	618	85	6
Water	102	79	25	0
Waste	204	160	30	2
Total	1,033	857	140	8

*Does not include 396 applications processed by the Technical Support Section of Central Region and forwarded to the Industrial Approvals Section for checking and approval.

Municipal and Private Approvals

The Municipal and Private Approvals Section processes approval applications made by municipal and private agencies for water supply and distribution systems, waste water collection and treatment facilities,

*D.P. Caplice has been appointed director of the Ministry's Central Region, succeeded by T.W. Cross, former director of the Air Resources Branch. Both appointments were effective in September 1980.

and sites and systems associated with waste management programs. The Section also licences septic tank installers and waste haulers and provides technical approval to applications made under Central Mortgage and Housing Corporations' subsidy programs and the Ministry of the Environment's Regional Subsidy program.

In 1979-80, the Section processed approximately 3,000 applications and approved approximately $700 million worth of water and sewage works for construction. The processing function was aided by the Ministry's transfer program in which selected municipalities assist with the technical review of applications. Additional municipalities were brought into the program during the year, and it is intended to extend this program further. The program was supported by draft design guidelines that were finalized during the year and are to be made available throughout the Province.

Considerable public interest was expressed concerning waste management disposal programs for which stricter requirements were adopted. The trend to larger regional sites being proposed to replace smaller inadequate facilities continued.

In 1979-80, the Section received 315 waste disposal site and systems applications of which 277 were approved. The applications resulted in ten hearings before the Environmental Assessment Board, four appeals, and various court actions. At year-end, there were 1,547 certified waste disposal sites and 1,064 waste management systems in Ontario.

Additional applications for licences from septic tank installers and waste haulers were received during the year; 3,171 Class 1 and 2 licences were active under Part VII of The Environmental Protection Act at year-end.

Land Use Co-ordination and Special Studies

The Land Use Co-ordination Special Studies Section advises other governmental agencies at all levels and the private sector on environmental matters related to land use planning. The Branch co-ordinates the Ministry's responses to regional development strategies, regional municipality official plans and other proposed land uses to ensure that all environmental aspects are considered. It initiates or carries out studies on environmental matters affecting land use, including the development of Ministry policies on land use. In June 1979, the staffing complement was reduced from nine positions to seven positions by the transferring of the economic analyst and the social analyst to the Program Planning and Evaluation Branch. This transfer was undertaken in order to centralize these skills in one branch.

One staff member was seconded to the Ministry Review Team to review policy and program development and program delivery functions. Special studies were carried out on land use buffers, analysis of complaints from environmental nuisances, wetlands and site reuse.

In 1979-80, the Section represented the Ministry on various interministerial or intergovernmental committees concerning the Agricultural Code of Practice, the clean-up of low level radioactive waste, the Canada-Ontario Agreement on Flood Damage Reduction, the Niagara Escarpment Commission Planning Area, Ontario base mapping, the Parkway Belt, cottage land policies, studies under the auspices of the International Joint Commission, the West Patricia Land Use Plan, urban drainage, mineral aggregate and wetlands.

The Section reviewed 35 documents submitted under The Environmental Assessment Act, 1975. The Section continued a major revision of the Land Use Planning Review Handbook, which is used by Ministry field staff in reviewing development proposals.

Section staff gave five speeches to conferences and seminars and five lectures at universities, polytechnical institutes and community colleges. Staff also supervised six Experience '79 projects.

Project Co-ordination Branch

Director: J.C.F. Macdonald

The Project Co-ordination Branch has prime responsibility for managing, co-ordinating and reviewing all Ministry capital sewage and water projects from inception to the completion of construction. During 1979-80, the Branch handled 244 construction contracts and administered a capital expenditure of approximately $139 million. Of this amount, 42.1 per cent was paid out as subsidies under the Ministry's construction program for municipalities (see Table 1 at end of this section).

In addition, the Branch is responsible for the administration and budgeting of the Ministry's:

- direct grant program for providing grants to assist the construction of municipally-owned water and sewage facilities (1979-80 expenditure $25.74 million);
- grant program to assist the construction of major water and sewage works in regional and restructured municipalities (1979-80 expenditure $6.5 million);
- grant program for low-cost alternatives to communal systems in small communities (1979-80 expenditure $1.423 million).

Project Management

The Project Management Section is responsible for the development and management of the Ministry's capital works program within the Ministry's six regions, excluding the large York-Durham area scheme. The Section administers the Ministry's Direct Grant Programs, including the development of budgets and the managing of cash flow, and provides project management services, when requested, on certain direct grant projects for small municipalites lacking resources or expertise for handling their own sewage or water works

projects (30 such requests were received during the year). The Section is frequently the delivery arm for other Ministries such as Northern Affairs, Treasury and Economics, Industry and Tourism, Housing and Intergovernmental Affairs in implementing sewage and water programs, particularly where such programs are carried out as provincial priorities.

Since March 1979, the Section has administered the expenditures under the Federal Community Services Program (CSCP), which replaced the former Canada Mortgage and Housing Corporation (CMHC) infrastructure assistance program. CSCP grants totalling $31.0 million, including $11.5 million for Ministry-financed projects, were committed for payment in 1980-81 (see Table 2 at end of this section).

Two Class Environmental Assessment Documents (one for the expansion and upgrading of existing sewage works, the other for the expansion and upgrading of existing water works) were completed during the year and were submitted for approval under The Environmental Assessment Act. These documents, when approved, will serve as the basis for the planning and implementation of all expansions or upgradings of existing sewage or water systems falling within such classes and will provide guidelines for municipal undertakings of this type from the date when such undertakings are proclaimed as coming under The Environmental Assessment Act.

In Northern Ontario, a number of high-cost projects were initiated, with funding support from the Ministry of Northern Affairs, and ongoing schemes were continued under the Branch's direction. Approximately $11 million was provided by Northern Affairs from direct administration by the Branch for these projects.

Two subsidy agreements under the General Development Agreement of the DREE/RPB (Department of Regional Economic Expansion/Regional Priority Budget) programs continued to be administered by management committees, which include representatives from DREE, the Ministry of Northern Affairs and the Ministry of Intergovernmental Affairs and the Branch's project manager for the particular region. The Northwestern Management Committee administers a $50.8 million program that includes sewage improvements in Thunder Bay and Ignace. The Northeastern Management Committee administers a $30.0 million program that includes services for industrial parks in Parry Sound, Sudbury and North Bay, as well as infrastructure in Timmins. The DREE/RPB program also included expenditures for infrastructure projects for single industry resource communities such as Nakina, Longlac, Geraldton, White River and Hornepayne.

Close liaison continued with the Ministry of Northern Affairs to administer new initiative programs in Northern Ontario. Northwestern Region projects were located in Balmertown, Ignace, Marathon, Jaffray & Melick, Ear Falls and Kenora. Northeastern Region projects were located in Chapleau, Cobalt, Moonbeam, Haileybury, North Shore and Sturgeon Falls.

With the promulgation of Bill 122, which provides for the establishment of Local Service Boards, the Branch is in a position to prepare agreements with unorganized communities for the first time. The communities of Gogama and Foleyet will be the first to benefit from the new arrangements. Preliminary test drilling for a well water supply has already been completed in Gogama.

Projects funded jointly by the Ministries of Northern Affairs and Environment have proven to be effective not only in terms of the MOE's objectives, such as pollution control, but also as a means of implementing the broader provincial objectives of improving the infrastructure necessary for growth and development.

In the Central Region, the first two contracts valued at $3.0 million were tendered for a $40 million four-year program for sewage and water services for the community of Keswick in the Township of Georgina.

Wasaga Beach sewage and water works projects, commenced in 1978-79, continued under design and construction with funding provided through the Ministry of Natural Resources. These projects will have cost about $16 million and are scheduled to be completed in 1981-82. An expenditure of approximately $6.5 million was allocated to the projects in 1979-80.

In the West-Central Region, the Haldimand-Norfolk Provincial area scheme was accelerated in 1979-80 to meet the Ministry of Housings' target date of September 1980 for having water servicing for the first phase of the new Townsend Community. The scheme involved the construction of seven miles of large-diameter trunk watermains. Fifteen separate contracts were tendered for these works.

York-Durham Projects

Construction continued on schedule on the York-Durham Sewage System and the York Water System with expenditures in 1979-80 of $42.57 million and $6.71 million respectively. Included was $16.87 million for the Duffin Creek Water Pollution Control Centre, which was intended to be put into operation in late 1979. A decision was made in November, however, to postpone start-up until Spring 1980. The new $60 million plant was scheduled to receive raw sewage in April 1980. Its operation was intended to allow three existing plants in Regional Durham and two plants in Regional York to be taken out of operation by April-May 1980.

Construction of the first phase of the York Water System was virtually completed during the year, resulting in Metro Toronto water becoming available in Woodbridge, Maple, Richmond Hill, Unionville and Markham.

Design and Equipment Review

The Design and Equipment Section reviews and evaluates design submissions received for approval purposes from consulting engineers for all sewage and water projects where contracts are to be let by the Ministry. The submissions are evaluated from the viewpionts of sanitary, mechanical and electrical engineering, and cost effectiveness, including energy utilization and conservation.

In 1979-80, the Section processed approximately 170 submissions, including major sewage and water projects in South Peel Region, York-Durham Area and

Haldimand-Norfolk Region. In addition, the Section was involved in the preparation of design guidelines and standard specifications for equipment.

Ground Water Development

The Ground Water Development Section supervised five test-drilling contracts and one well-construction contract with a total value of $281,000. The Section undertook four ground water surveys and seven special investigations, involving well testing and analysis of well and aquifer performance for Ministry projects. The Section was also extensively involved in the investigation and resolution of well water interference complaints arising from Ministry contractors' dewatering activities in six water and sewage construction projects. In addition, the Section reviewed reports on low-cost alternative proposal schemes.

Project Control

The Project Control Section co-ordinates the compilation of data and the preparation of schedules relating to anticipated expenditures and cash flow for Ministry sewage and water works programs. The Section monitors and records commitments and expenditures and advises on the scheduling of contracts to meet budgetary requirements. Various statistics on costs are compiled as required.

The Section continued its active participation in the Ministry's Project Evaluation Group, which assesses the priorities of proposed works and assigns MBR gradings. (see Tables 1 and 2 at the end of this section and Graphs I to IV in appendices).

Claims and Contracts

The Claims and Contracts Section handles disputed claims for payment made by contractors, third parties, etc., and assists in arbitration or litigation arising from such claims. The Section investigates technical and contractual bases for claims and reviews matters with consulting engineers and expert witnesses.

The Section receives tenders, reports on tenderers' financial statements to Senior Management, carries out documentation related to the awarding of contracts, arranges for the execution of agreements and deals with Notices of Claim under the Mechanics Lien Act.

The workload of construction claims carried to arbitration or litigation continued to be heavy and necessitated considerable close liaison with counsel of the Legal Services Branch and the Ministry of the Attorney General in relation to examinations for discovery, preparation of documents and hearings.

Special Activities

The Special Activities Unit provides special inspection of construction; investigation of unusual construction problems; administration of the Ministry's prequalification system for concrete sewer pipe plants; representation on committees involving standardization, metrication and co-ordination; and other administrative and support activities.

The Unit carried out approximately 95 field inspections of Ministry sewer and water works projects during the year. These included inspections during construction, at substantial completion, and at the end of the one-year maintenance period. In addition, approximately 15 man-days were spent on the investigation and resolution of special construction problems.

The Construction Inspectors' Courses (Nos. 1 and 2), sponsored jointly by the Ministry and the Municipal Engineers' Association, were again held. Approximately 60 candidates from municipalities and consulting engineering companies attended each of the one-week courses.

Staff spent considerable time through the year on the review and drafting of standards and specifications and in the evaluation of new projects proposed for incorporation into Ministry works.

Field Services

The Field Services Section includes specialists in mechanical and instrumentation equipment fields and provides technical advice and skills with respect to new and operational sewage and water works installations. These activities cover the design, construction and maintenance phases of Ministry projects.

In addition, the Section provides emergency service as required and carries out maintenance audit inspections of operational plants.

During 1979-80, 76 per cent of staff time was spent on the capital works program; 24 per cent on operational installations.

TABLE I

PROJECT CO-ORDINATION BRANCH

Volume of activity under Capital Construction Program during **1979-80**

1.	**Capital Expenditure**	139,482,100
	Sewage Works	110,574,900
	Water Works	28,907,200
	Provincial Projects	138,303,700
	Municipal Projects	1,178,400
	Provincial Subsidy	58,785,043
	% of total expenditure	42.1
2.	**Construction**	
	Contracts Tendered — No.	93
	$ Value	93,032,521
	Contracts Started — No.	110
	$ Value	114,456,000
	Contracts Completed — No.	122
	$ Value	135,573,000
	Contracts Under Construction During the Year	244
	Average Number of Contracts Under Construction in each month	130

TABLE II

PROJECT CO-ORDINATION BRANCH

Grants to municipalities for sewage works and water works during 1979-80.

1.	MBR priority evaluations		
	(1) Direct Grant Program requests		
	Ruled eligible	38	
	Rejected	19	
			total evaluated
	(2) Private Systems Program requests		
	Ruled eligible	38	103
	Rejected	8	
2.	Direct Grant Program payments (15% to 75% grants)		$25,740,000
3.	Private Systems Grant Program payments (75% grants)		$ 1,423,000
4.	Grants to Regional and Restructured municipalities (15% grants)		$ 6,497,800
5.	Federal CSCP Grant commitments for payment in 1980-81 (administered by MOE)		$31,000,000

Waste Management Branch

*Director: L.F. Pitura

Experimental Plant for Resource Recovery

The Transfer Station Section of the Experimental Plant continued in routine operation with no significant problems. Modifications to the corrugated cardboard recovery system in mid-year resulted in a substantial increase in the recovery of corrugated cardboard, the highest unit value commodity generated at the plant. The resource recovery facilities remained in a shake-down phase until July 1979 at which time equipment problems and operational procedures had been resolved sufficiently to permit routine operation at the production goal of 200 tonnes per day. As a result of explosions in the primary shredder area, extensive damage reduction measures were undertaken and completed in the Fall of 1979.

With the completion of a composting screening system in April, replacement of a conveyor in September, and improved operating procedures, routine operation of the composting facilities was achieved early in 1980, with compost throughout being controlled at approximately 70 per cent of design.

Equipment was received for future installation to improve the quality of the recovered ferrous product. Favorable results of test work with a screening system to remove the fines from the refuse derived fuel will likely result in the installation of production screening equipment. A preliminary study relating to occupational health hazards was undertaken.

Marketing and Market Development

Marketing of the recovered ferrous product (5 per cent of incoming waste) continued with the material being sold both as recovered in shredded form and densified by baling. The largest end-user of the shredded ferrous was Lake Ontario Steel Company, a market steel mill. Densified bales were marketed to several iron and steel foundries including: General Motors Canada (St. Catharines Foundry), Brown and Boggs Foundry and Machine Company, McCoy Foundry, CAE-Cleveland Abrasives and Bell City Foundry.

The major recovered product at the Experimental Plant is the light fraction for refuse derived fuel (RDF). The full-scale demonstration project, involving the use of this material as a supplementary fuel at the Canada Cement Lafarge Company's Woodstock facilities, continued. Successful operation was attained with fossil fuel substitution rates of up to 20 per cent with no adverse effects on clinker quality. A continuous 17-day test burn, involving the use of refuse derived fuel at substitution rates ranging from 20-40 per cent, was planned for the Spring of 1980. Other market development areas being explored for the use of the light fraction include use as an energy source in the brick manufacturing industry and in fire log manufacturing. Additional work was conducted on the use of this fraction for making mulch, a finely ground cellulose product widely used in hydroseeding. Since it also has long-term potential as a source of cellulose fibre, preliminary studies were carried out on the separation of plastic from the RDF fraction and on the use of RDF as a feedstock for making industrial cellulose insulation or building board.

Several test trials involving the use of compost from the Experimental Plant were carried out during the year. These preliminary trials, conducted by Northumberland County, the Metropolitan Toronto Conservation Authority and TCG Materials Limited of Brantford, were all considered successful. Large tonnage demonstration projects were being planned for the Spring of 1980 with these groups, with additional work to be conducted in the Regional Municipality of Hamilton-Wentworth. Several studies are under way to determine the potential of using compost as a growing medium for nurseries and as a turf builder for parks and recreational areas. Compost was used in a hydroseeding application on a test portion of the Highway 403 extension.

Material/Energy Recovery

The technical and economic feasibility study of the Peel Resource Recovery Project was completed in December 1979. Peel Council requested the Province to review possible restructuring of the project in order that the Region would not be assuming the full amount of risk. The Watts from Waste Project was reviewed and, in view of the estimated costs and the poor performance of similar plants in the United States, a decision to proceed was deferred. This decision will be reconsidered on completion of the Metro Toronto Master Plan for waste management, which will assess Watts from Waste in comparison with Toronto District Heating or conversion of Ontario Hydro's R.L. Hearn Plant to garbage firing.

The Ministries of Environment and Energy are working together on a joint Energy from Waste Program. Feasibility studies under way involve the City of North Bay, the City of St. Catharines, the City of London and the Region of Niagara.

Source Separation

Extensive monitoring of four pilot projects on residential source separation in co-operation with Etobicoke, the City of Toronto, Aurora and Georgetown was completed. A report on the results of these projects will be completed in mid-1980. The recovery of waste newspaper from municipalities in Southern Ontario will be expanded to accommodate the demand for waste fibre at the Ontario Paper Company de-inking plant in Thorold.

Project Paper Recycling was implemented in 17 government buildings in Metropolitan Toronto and

*L.F. Pitura was appointed director, Organization Policy Branch, Management Board of Cabinet. He was succeeded as director of the Waste Management Branch by C.J. Macfarlane, former director of the Ministry's Central Region.Both appointments were effective in September 1980.

involved approximately 8,000 employees recovering fine office paper. Means of promoting the extension of the concept to other types of buildings such as large office buildings, schools and municipal buildings, were under consideration at year-end.

Solid Waste Management

The Ministry is sharing with Metropolitan Toronto the development of a solid waste master plan using a computer model developed by the Ministry. The plan will provide a long-term framework for waste management planning including resource and energy recovery for Metropolitan Toronto.

Waste management studies were carried out in Sault Ste. Marie and the District of Muskoka.

During the fifth and final year of the derelict motor vehicle program, ten new contracts were developed at a total cost of $50,000. No new sites were established. Altogether, a total of 57 operational facilities were set up, and more than 27,000 hulks were collected for recycling during the program.

The Waste Management Improvement Program generated 144 new contracts with municipalities at a cost of approximately $450,000. The majority of work was directed at upgrading existing waste disposal facilities; however, several projects involved green-belt, beach and river side clean-ups.

The gas migration study proceeded with development of a detailed work plan and site selection. This three-year study will cost approximately $287,000.

The Branch contracted with the Ministry of Natural Resources for a Remote Sensing Study to be carried out to develop techniques such as true color, infrared and thermal imagery for application in waste management studies. This $90,000 study will take approximately 18 months and should provide data that will complement efforts in the gas migration and site identification studies.

A site identification study was commissioned for approximately $100,000 to attempt to locate and identify old waste disposal facilities that were closed prior to 1971 when the Ministry began a certification and documenting program. Future activities are to include field investigations, remedial measures and monitoring.

Disposal of Liquid Industrial Wastes

The Waste Management Branch continued with a number of activities to implement the Ministry's seven-point program for the disposal of liquid industrial wastes. These include refinements to the waybill monitoring system; the receipt of a report by M.M. Dillon Limited on the storage and handling of PCBs; the retaining of James F. MacLaren Limited for the reporting on requirements for a variety of waste treatment facilities; the funding of costs for the conversion of the Duffin No. 2 WPCP (Ajax) to a liquid industrial waste treatment facility; the development of various guidelines and regulations; and the establishment of a task force to develop a "perpetual-care" program for waste disposal sites.

The James F. MacLaren interim report was completed in the Fall of 1979 at which time public interest groups were requested to comment. The final site selection and preliminary design were being completed at year-end.

Proposed Liquid Industrial Waste Treatment Facilities

The Environmental Assessment Board is currently holding public hearings under The Environmental Protection Act, 1971 to consider the proposal to convert the Ajax WPCP to a 8.8 MGY liquid industrial treatment plant. The Ministry entered into an agreement to provide up to $270,000 to fund the hearing and engineering costs.

The environmental assessment documents for two interim solidification projects were filed, and it is expected that a hearing would be held by the end of 1980. The Ministry is a co-proponent with two private firms, Walker Bros. Quarry and Browning-Ferris.

A study by M.M. Dillon was completed and the Middleport transformer station near Brantford was selected by the Ministry as the proposed location for an interim PCB storage facility. At year end the firm was completing the environmental assessment document for submission.

Transfers of Liquid Industrial Wastes

The waybill system for the controlling of the movement of liquid waste underwent a number of revisions. By mid-Summer 1980, the program is expected to be automated, thereby providing improved statistical data and more efficient information for the Ministry's abatement control program.

PCB Handling and Disposal

A regulation was drafted to control the movement of PCB wastes. The regulation is intended to supersede the existing guidelines in several areas.

Monitoring techniques were refined to where levels of PCB below the background level can be measured consistently. At year-end, the Ministry was also involved in funding research into a number of innovative means of destroying PCB wastes.

Pulp and Paper Industry Incentives

During 1979-80, ten companies made submissions for grants from the Employment Development Fund. Each submission was reviewed by the Advisory Committee, which included Ministry Staff. The review included the following aspects: modernization, environmental content, employment woodlands, Canadian content, marketing, financing. At several mill locations, major modernizations will improve the environmental effects significantly. Some existing Control Orders were changed to include items in the five-year plans. A number of new Control Orders were issued to identify environmental changes in the five-year plans.

As of April 28, 1980, the status of the grant program was as follows:

	Source and Amount of Funds in Million $			
	Ontario	Canada	Company	Total
Abitibi-Price Inc.	15.0	7.5	173.7	196.2
American Can of Canada		Submission under review		
Boise-Cascade Canada		Submission under review		
Domtar Inc.	10.5	5.3	117.8	133.1
E.B. Eddy Forest Products	16.7	8.3	200.0	225.0
Great Lakes Forest Products	25.3	12.7	297.0	335.0
Kimberly-Clark of Canada		Submission under review		
MacMillan Bloedel		Submission under review		
Ontario Paper Company	21.3	10.7	228.0	260.0
Spruce Falls Power & Paper	4.7	2.3	63.8	70.8
GRAND TOTAL	93.5	46.8	1,079.8	1,220.1

Radioactivity

Radioactive waste is of growing concern to the Ministry of the Environment. Accordingly, the Waste Management Branch has had, from its inception, a nuclear physicist who deals with the problematical subject.

As the present legislation (1946 Atomic Energy Act) gives the federal government's Atomic Energy Control Board overall responsibility for radioactive materials. The scientist works closely with the Board on various projects, including the clean up of low-level radioactive waste in Port Hope and Bancroft to ensure that Ontario's interests are properly addressed.

The scientist provides a consulting service for other Branches and for the Regions. He comments on the significance of radionuclides analyzed in environmental samples and undertakes special studies on request—e.g., regarding radioactive materials at Deloro and natural radioactivity on Great Manitou Island in Lake Nipissing.

He has close contact with the Radiation Protection Service of the Ministry of Labour and aids the Service in work connected with the Province's Nuclear Contingency Response Plan.

Mining

Known mineral tailings masses in the Province of Ontario cover 24,767 acres (38.7 square miles) and contain 1,077,352,000 tons of tailings. Active mines generate an additional 100,243 tons of tailings per day.

Several hundred tailings disposal areas exist in Ontario, ranging in size from less than two acres to more that 1,000 acres. Their usual size is from 50 acres to 300 acres.

The Waste Management Branch released a major report entitled "The Chemical Characteristics of Mineral Tailings in the Province of Ontario". This report contains the levels and probable impacts of various chemical substances found in tailings areas across Ontario.

regional operations and laboratories division

Assistant Deputy Minister: W.B. Bidell

The Regional Operations and Laboratories Division provides a wide range of services including: environmental protection, abatement programs and complaint investigations; environmental assessment; and the operation and management by Ministry staff of water and sewage works systems constructed by the Ministry.

In addition, the Division provides analytical and research support to the Ministry through the operation of provincial and regional environmental laboratories.

Northwestern Region

Director: R.M. Gotts

Industrial Abatement

During 1979-80, Control Orders were issued to Domtar Packaging Limited, Red Rock and Kimberly-Clark of Canada Limited, Terrace Bay (both pulp and paper mills), and to Industrial Grain Products Limited, Thunder Bay, which produces grain starch. Control Orders for Great Lakes Forest Products Limited (Dryden), Boise Cascade Canada (Fort Frances), American Can of Canada Inc. (Marathon) and Great Lakes Forest Products (Thunder Bay) were under preparation at year-end.

The Control Orders will require the companies to carry out comprehensive air and water abatement programs in order to achieve substantial reductions in 1) biochemical oxygen demanding substances, suspended solids and toxicity in liquid effluents, and 2) total reduced sulphur, total suspended particulate, sulphur dioxide and oxides of nitrogen in air emissions.

Great Lakes Forest Products, Abitibi-Price and Domtar were also awarded grants under the Pulp and Paper Industry Facilities Improvement Subsidiary Agreement to modernize and install pollution abatement equipment. The pollution abatement programs outlined in the grants have generally been or will be covered in the Control Orders to the individual mills.

The extensive air pollution abatement programs directed towards reduction of dust emissions from the terminal grain elevators in Thunder Bay were essentially completed during 1979-80. Levels of dust emissions from these elevators were approximately five per cent of the pre-abatement levels of the early 1970s. An evaluation of the programs at each of the elevators will be carried out to establish if further abatement measures are required.

A number of parties approached the staff on Ministry requirements concerning gold and silver mine development. A few of the developments were expected to commence operation during 1980-81.

Municipal and Private Abatement

Staff continued to monitor all communal water and sewage treatment facilities within the Region. Special bacteriological and chemical water quality studies of communal water distribution systems, sewage treatment plant loading studies and water pollution surveys were conducted.

Ontario

Ministry of the Environment

REGIONS AND OFFICES IN ONTARIO

Regional & District Offices

NORTHWESTERN REGION:

Thunder Bay Regional Office,
435 James St. S.
Thunder Bay P7C 5C6
Tel.: 807/475-1205

Kenora District Office,
808 Robertson St.,
Kenora P9N 1X9
Tel.: 807/468-5578

NORTHEASTERN REGION

Sudbury Regional Office,
199 Larch St.,
Sudbury P3E 5P9
705/675-4501

Timmins District Office,
83 Algonquin Blvd. W.,
Timmins P4N 2R4
Tel.: 705/264-9474

Sault Ste. Marie District Office,
445 Albert St. E.,
Sault Ste. Marie P6A 2J9
Tel.: 705/949-4640

North Bay District Office,
1500 Fisher St.,
Northgate Plaza,
North Bay P1B 2H3
Tel.: 705/476-1001

Parry Sound District Office,
74 Church St.
Parry Sound P2A 1Z1
Tel.: 705/746-2139

CENTRAL REGION

Suite 700, 150 Ferrand Dr.,
Don Mills M3C 3C3
Tel.: 416/424-3000

Barrie District Office,
12 Fairview Rd.,
Barrie L4N 4P3
Tel.: 705/726-1730

Muskoka-Haliburton District Office,
Gravenhurst P0C 1G0
Tel.: 705/687-3408

Peterborough District Office,
139 George St. N.,
Peterborough K9J 3G6
Tel.: 705/743-2972

Halton-Peel District Office,
1225 White Oaks Blvd.
Oakville L6H 2B9
Tel.: 416/844-5747

Huntsville Sub-Office,
100 Main St. E.,
Huntsville P0A 1K0
Tel.: 705/789-2386

SOUTHWESTERN REGION

London Regional Office,
985 Adelaide St. South,
London N6E 1V3
Tel.: 519/681-3600

Windsor District Office,
250 Windsor Ave., 6th Floor,
Windsor N9A 6V9
Tel.: 519/254-5129

Sarnia District Office,
242 A Indian Rd. South,
Suite 209 S.,
Sarnia N7T 3W4
Tel.: 519/336-4030

Owen Sound District Office,
1180 Twentieth St.,
Owen Sound N4K 6H6
Tel.: 519/371-2901

Chatham Sub-District Office,
435 Grand Ave. W.,
Chatham N7L 3Z4
Tel.: 519/352-5107

WEST CENTRAL REGION

Hamilton Regional Office,
140 Centennial Parkway N.,
Stoney Creek L8E 3H2
Tel.: 416/561-7410

Cambridge District Office,
400 Clyde Rd.,
Cambridge N1R 5W6
Tel.: 519/623-2080

Welland District Office,
637-641 Niagara St. N.,
Welland L3C 1L9
Tel.: 416/735-0431

Simcoe Sub Office,
645 Norfolk St. N.,
Simcoe N3Y 3R2
Tel.: 519/426-1940

SOUTHEASTERN REGION

Kingston Regional Office,
133 Dalton St.,
Kingston K7L 4X6
Tel.: 613/549-4000

Ottawa District Office,
2378 Holly Lane,
Ottawa K1V 7P1
Tel.: 613/521-3450

Cornwall District Office,
4 Montreal Road, 2nd Floor,
Cornwall K6H 1B1
Tel.: 613/933-7402

Belleville District Office,
15 Victoria Ave.,
Belleville K8N 1Z5
Tel.: 613/962-9208

Pembroke District Office,
1000 MacKay St.,
Pembroke K8A 6X1
Tel.: 613/732-3643

Water and sewage construction projects, including sewer and watermain extensions, continued in various municipalities. Projects were completed or are being completed at Kenora, Red Lake, Rainy River, Geraldton, Longlac and Nakina. Construction of a sewage treatment plant in Atikokan was begun and new projects were initiated in Rossport, Marathon and Balmertown. Ear Falls and Beardmore officially opened their water and sewage treatment facilities.

Staff continued to inspect all municipal and provincially operated waste disposal sites within the Region. Funds were provided through the Waste Management Improvement Program to improve the operation of many municipal sites.

Project Remove was completed this year with the removal of all vehicles from the Pickle Lake derelict motor vehicle site.

The Cottage Pollution Control Program was carried out along the north shore of Lake Superior, Walker Lake in Schreiber and the Sibley Peninsula.

The Boating and Marina Inspection Program was continued with emphasis on marinas in Thunder Bay.

There was an increase in the number of exterminator licences issued under The Pesticides Control Program, particularly for brush and weed control. In co-operation with Lakehead University, the land exterminator licencing program was integrated into the forestry degree program. There continues to be increased general interest in pesticide use, particularly in forestry pesticide use programs.

Air Quality

The **Air Quality Assessment Unit** continued its monitoring program in seven urban centres in the Region and issued annual air quality reports for these areas for the year 1978. The air quality network was extended to an eighth community—Red Rock—in early 1979. Special air quality surveys and vegetation, soil and snow sampling studies were also conducted near selected local industrial air pollution sources. Complaints of vegetation damage were investigated following a sulphur fire in Thunder Bay and a release of chlorine from a pulp mill in Dryden.

Presentations were made to public participation meetings concerning the preparation of Control Orders for pulp and paper mills in the Region. Plans were developed to begin a regional precipitation sampling program and to commence a long-term study of the effects of acid precipitation on the terrestrial ecosystem of northwestern Ontario.

Water Quality

The **Water Resources Assessment Unit** continued its operation of a 47-station water quality monitoring network for lakes and streams in the Region (notably those affected by industrial and municipal wastes or urban runoff). The Unit conducted regular sampling at 11 sites in support of the tributary monitoring program of the International Joint Commission for streams entering Lake Superior.

Other major survey activities included participation in the second year of a joint federal/provincial study of mercury pollution at the Wabigoon-English River systems; preliminary sampling of 40 lakes in the Atikokan area with respect to both pre-operational monitoring of the Atikokan thermal generating station and the more general concerns relating to the effects of acid precipitation in the Province; analysis of samples from wells in the Thunder Bay area for chemical quality; a water quality evaluation of Confederation Lake conducted to assess the impact of mining activities; an assessment of the water quality of 60 lakes across the Region for potential effects by lakeshore development of residences and summer cottages. Presentations were made at public participation meetings concerning the preparation of Control Orders for two pulp and paper mills.

Environmental Planning

The **Approvals and Planning Unit** continued to co-ordinate regional responses to environmental impact statements and to review municipal subdivision proposals. The Unit took an active role in project evaluation through staff participation in technical advisory committees and pre-submission consultation with many proponents. Staff assisted with the documentation of regional computer data-handling needs and equipment selection.

Laboratory Operations

The analytical workload over the year was similar to the level of the previous year. Additional analytical capabilities were acquired, including low-level alkalinity, auto-analyzer chloride and dustfall particulate identifications. Analytical techniques were revised to improve the detection of fecal contamination in well water samples.

In addition to providing analysis service for MOE programs, the Regional Laboratory in Thunder Bay provided analytical support for both MNR and federal fisheries programs.

Northeastern Region

Director: C.E. McIntyre

Industrial Abatement

One new Control Order and one Amending Control Order were issued in 1979-80. The Amending Control Order was issued following public input at a meeting. All items of all existing Control Orders were met in terms of intent with the exception of one where charges were pending at year-end. Four other Control Orders were in various stages of preparation. In total, 312 complaints were received and investigated; virtually all were resolved. In addition, 212 spills were reported, investigated and adequately cleaned up.

The earth-filled dam on Farr Creek, which washed out in the Spring of 1979, was replaced with the co-operation of the Ministry of Natural Resources. Unfortunately, due to weather conditions during the construction period, difficulties were encountered that remain to be resolved during 1980-81.

Twenty-two charges were laid against a mining operation in the Region with the initial court decision being 'not guilty'. This decision was appealed and will be heard in the Fall of 1980. A meeting was arranged for public input to a request for amendment of another Control Order. The public response was in favor of the proposed amendment and an Amending Order will be issued.

Municipal and Private Abatement

One Minister's Order, nine Control Orders (eight under Part VII), and three successful prosecutions were initiated during 1979-80. In addition, two stop orders were issued to prevent aerial spraying of pesticides by unlicenced applicators. The spraying proceeded after proper licences had been obtained.

Forty-one inadequate waste disposal sites were closed, 106 inadequate waste disposal sites were upgraded, while 15 new waste disposal sites were under development at year-end. More than 8,000 derelict motor vehicles were collected in the Region for recycling.

Twenty-five private-system funding projects were under development in the Region in 1979-80. More than 750 complaints were received and investigated by Municipal and Private Abatement staff and 55 spills were adequately cleaned up. Five waste management studies were under way in the Region, while six pollution surveys were completed.

Air Quality

Approximately 200 instruments and recorders monitored air quality throughout the Region. The suspended particulate and dust fall surveys in the Elliot Lake area continued to supply information for judging the future impact of the expanded uranium mining industry.

With the assistance of the Air Resources Branch, the installation of a real-time telemetered data acquisition system was completed in early 1980. The system collects, averages and relays Sudbury air quality and meteorological data from a number of field stations to the regional office, where it is printed out in hard copy and also stored on magnetic tape. This system permits an improved monitoring of the effectiveness of abatement measures being carried out at Sudbury-area smelters.

Special air quality surveys were undertaken during the Inco Limited strike to monitor the influx of sulphates and nitrates into the Region while Inco was not operational.

The Plant Pathology Unit collected more than 1,700 samples of vegetation and soils throughout the Region and investigated 59 complaints of suspected air pollution injury to vegetation. Of the complaints, 23 were determined to be related to air pollution problems. The major air pollutant causing injury to vegetation was ozone, which is carried into the Region as a result of

long-range transport. In order to better monitor the effects of vegetation of air pollutants imported by long-range transport, 16 white pine plots and 10 tree seedling plots were established. It is intended to expand this program in 1980-81.

An International Air Pollution Workshop was hosted in Sudbury, the first time this workshop has been held in Canada. A major report on air quality assessment studies in the Timmins area was published and released in April 1979.

Water Quality

Altogether, 177 Water Quality Monitoring stations were regularly sampled and 12 stream flow recording stations were maintained. Thirty-seven permits to take water were issued, while 100 lakes in the Region were sampled as part of a continuing program to determine the effects of acid rain. Staff provided assistance to the Ministry of Natural Resources in the sampling of a further 119 lakes related to this program.

Major reports were issued on the water quality of the Lower Sturgeon River, the water quality of Eagle Lake near South River and the water quality of Trout Lake at North Bay. Twenty-two water quality assessment studies were undertaken and 89 lake classification evaluations were completed. Nineteen groundwater quantity and quality investigations were undertaken. In total, 1,293 well records were verified and more than 100 contacts were made with well drillers and plumbers to upgrade their services to the public.

Utility Operations

The Region operated 49 sewage works and 23 water treatment plants during 1979-80. New water pollution control plants were placed in operation in Blind River and Thessalon; a new water treatment plant was made operational in Hearst. Two sewage works and one water works were returned to municipalities for operation in the year according to continuing government policy in this regard.

Staff completed safety audits at all projects and facilities during the year. In addition, training workshops and seminars were arranged for staff on defensive driving, confined space entry procedures, Ontario Health and Safety Acts and the care and use of self contained breathing apparatus. No fatalities or permanent injuries were suffered by any personnel in the Region during the year.

Central Region

*Director: C.J. Macfarlane

Significant activities included an air quality improvement program in the core area along Lake Ontario, the adoption of an improvement program for Lake Simcoe-Couchiching and the control of phosphorus inputs to waterways.

Of major importance in the year was the Mississauga derailment on November 10-11, 1979. Tank cars containing compressed gases, chlorine, styrene, toluene and caustic soda were damaged and their contents were released to the environment. All sections of the Region participated in providing on-site advisory support on environmental matters to the Region of Peel Emergency Measures Organization. After the damaged cars were emptied of their contents, direction was given to clean-up crews on the removal and disposal of contaminated soil and seepage waters. Contaminated seepage waters were hauled to the Clarkson sewage treatment plant and fed at a controlled rate through the plant. The disposal procedures were monitored to ensure that the environment was not adversely affected. The contaminated soils were disposed of at the new Britannia Road regional waste management site.

Industrial Abatement

Elevated lead levels were recorded around the Canada Metal Company Limited plant on Eastern Avenue in the City of Toronto. The Region successfully prosecuted the company and issued a very comprehensive Control Order to deal with the emissions from the plant. Additional baghouses were the major requirement of the Control Order. A consistent improvement had been noted at air monitoring stations in the area.

Investigations and surveillance of the sources, haulers and receivers of liquid industrial wastes intensified during the year. Legal action was initiated in some cases and was under consideration in other cases at year-end. The majority of agents involved with the disposal of liquid wastes are complying with the waybill system.

As a result of the Mississauga train derailment, the emergency spill response system in the Region was being reviewed at year-end with a view to establishing more formalized response procedures. The implementation of Bill 24, when its regulations are available, will be an integral part of the finalized spill response system.

Municipal and Private Abatement

Recreational lakes surveys were undertaken in the District of Muskoka on Nine Mile Lake and Lake

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*C.J. Macfarlane has been appointed director of the Waste Management Branch, succeeded by D.P. Caplice, former director of the Ministry's Environmental Assessment Branch. Both appointments were effective in September 1980.

Muskoka; in the Provisional County of Haliburton on Esson, Kashagawigamog and Miskwabi Lakes; in Peterborough County on Mississauga and Catchacoma Lakes, Catchacoma Narrows and Beaver, McGinnis and Gold Lakes. A total of 1,941 cottages were inspected to ensure that sewage treatment facilities were adequate for the purpose of protecting the quality of the recreational waters. When malfunctioning or pollution systems were located, agreements were entered into with the owners for the installation of corrective works.

Emphasis was placed on upgrading waste management sites and the development of new sites where existing facilities were proving to be inadequate. Of major importance was the completion of a new regional site in the Region of Peel. A total of 1,476 inspections were made of operating sites during 1979-80 to ensure compliance with legislation.

A total of 2,023 inspections were made of water and sewage works to ensure compliance with provincial requirements. Sewage work inspectors were concerned in part with the control of phosphorus inputs to the water environment. The majority of the plants were able to meet the 1.0 mg/1 standard of the Canada-Ontario International Joint Commission Agreement. In the case of the Lake Simcoe-Couchiching Basin, a joint municipal-provincial committee recommended stringent phosphorus control programs on the basin. The Cabinet Committee on Resources Development proposed the adoption of an improved quality alternative for the two lakes whereby the phosporus loading would be reduced from 105 to 87 tonnes per year.

Air Quality

The major improvements in Toronto's air quality achieved over the previous ten years were maintained during 1979. The sulphur dioxide level in 1979 was lower than the 1978 level and well below the annual criteria. Suspended particulate remains slightly above the annual criteria. The A.P.I. (Air Pollution Index) exceeded the maximum desirable level on only two occasions, but did not reach the first-alert level. Monitoring for hazardous substances was continued in 1979. The intensive lead monitoring program in the vicinity of five Toronto-area lead plants was maintained. Airborne asbestos was monitored at three asbestos-using plants in the Region.

During the year, 360 applications relating to air emissions were processed and approved. Evaluations involved analysis of combustion equipment, plant and process exhausts with or without control equipment. Particular attention was given to asbestos and heavy metal emissions and other potentially hazardous substances such as TDI, MDI, PVC and PCB.

Water Quality

Studies were carried out on a number of recreational lakes, either to assess their sensitivity to development, or to establish and maintain a data base for long-term water quality trends. Six lakes, (Salmon, Fortescue, White, Galloway, Greens and Picard) in Peterborough County were studied. In the District Municipality of Muskoka and the Provisional County of Haliburton, a co-operative MNR/MOE survey program was undertaken to define the existing quality and assess the sensitivity of four lakes, Lower Fletcher, Pine, McFadden and Oxtongue, currently managed as lake trout waters. Studies were conducted to update the water quality information for Fairy and Peninsula Lakes in Muskoka and to determine their waste assimilative capabilities. The self-help program, whereby citizens collect water quality data for recreational lakes, was increased to 82 lakes. Generally, the quality of Precambrian lakes monitored under this program has remained reasonably constant.

Studies were undertaken on the receiving waters at ten sewage treatment plants to assess the impact of the discharges. The data will be used to determine how well the water quality objectives in the Ministry's new policy document are being met and to establish the need for additional work at other locations.

As a result of proposed urban development in a number of municipalities, stream assimilation studies were conducted to assess the impact on the receiving waters from discharges at the following sewage treatment facilities: the Stouffville plant, which discharges to West Duffin Creek; the Acton facility, which discharges to Black Creek; the Georgetown plant, which discharges to the West Branch of the Credit River; and the Havelock Sewage Lagoons, which discharge to Plato Creek. The data collected will be used to document stream quality and to establish allowable waste loadings for proposed expansion of these facilities.

Due to the increasing concerns relating to the impact of acid precipitation on waters in the Precambrian Shield area, a sampling program was initiated at eight locations on the Muskoka River system. The largest variations in pH and alkalinity values, due to the influx of acidic waters from the melting snow, occurred in the upstream areas of the system. Further downstream in the system, the dampening effect of large on-stream lakes was evident, as the variations in pH and alkalinity were greatly reduced. Regional staff sampled 51 Precambrian Shield lake trout lakes as part of the Acid Precipitation Study in Ontario. The data obtained from this survey will aid in determining the relative sensitivity of these lakes to acid precipitation.

The groundwater group of the Water Resources Assessment Unit investigated 32 complaints about individual well water quality problems. Many of these resulted from poor well construction and maintenance or high iron and/or bacterial content in the well waters. The group also investigated 28 complaints concerning lowered water tables allegedly caused by water withdrawals and excavations. Salt contamination problems were investigated in 11 communities, of which the most significant were Manchester (Township of Scugog) and Goodwood (Township of Uxbridge).

The hydrogeological setting of a number of proposed landfill sites and the monitoring results of existing sites were reviewed to determine the likely impact on local ground and surface water quality through the production, movement and attentuation of leachate. Sites assessed included Beare Road, Brock Road West and North (Metro Toronto sites); York Sanitation #1, #2 and #4 (Town of Whitechurch-

Stouffville); Nelson (Township of Otonobee, City of Peterborough); Township of Vespra.

Thirteen stream flow recording stations were maintained, while periodic measurements were made at 11 additional sites. Water quality samples were collected at 199 stations with the help of the Credit Valley, Halton Region, Metropolitan Toronto and Region and South Lake Simcoe conservation authorities. Radiological monitoring of surface and groundwaters in the Township of Cardiff and at the Eldorado Nuclear Facilities in Port Hope and Port Granby was continued. Thirty continuous recording observation wells were operated in the Region to monitor fluctuations in groundwater levels.

Environmental Planning

The environmental planning expertise of the Technical Support Section was frequently called upon to co-ordinate Ministry comments and determine the Ministry position on development proposals submitted under The Planning Act. As well, the planners within the Region increased liaison within the municipalities, wherever possible, to provide advice on the designation of land uses within municipal plans. Liaison with private developers and their consultants continued to introduce environmental factors at early stages of design.

Review of plans submitted under The Planning Act was increased, as was the review of documents and proposals submitted to fulfill the requirements of The Environmental Assessment Act.

Utility Operations

The Regional Utility Operations Section operated 17 sewage treatment plants and lagoons and nine water treatment plant and well facilities in 1979-80. These facilities serve approximately 500,000 population.

Operational responsibility for the major treatment facility of the York-Durham sewage system at Duffin Creek was transferred to the Region of Durham.

Negotiations were successfully complete whereby the Town of Midland assumed operational responsibility for its sewage works. The Town of Midland also assumed responsibility for the construction of additional works to convert the plant from simple primary to complete secondary treatment.

West-Central Region

Director: G.H. Mills

Industrial Abatement

Further progress in pollution control was made by the steel mills in Hamilton. The second stage of the east side filtration plant at Stelco was placed in operation. All finishing wastewaters are now being filtered to remove suspended solids and oil. Experimental collection hoods were installed in blast furnace No. 4 casthouse at Dofasco and in 'C' blast furnace casthouse at Stelco to collect fugitive emissions during casting. The effectiveness of these hoods was being assessed at year-end. Stelco was preparing for start-up of its new LED mill at Nanticoke. The most up-to-date pollution control facilities have been installed in this mill.

Ontario Hydro completed conversion of its Nanticoke Generating Station from burning only United States coal to burning a blend of equal amounts of United States and Western Canadian coals. One of the reasons for this conversion was to reduce sulphur dioxide emissions. The Sulphur content of Western Canadian coal is only about eight per cent of United States coal.

Efforts continued with a number of foundries in the Region to reduce or control emissions. Bibby Foundry Limited at Cambridge completed installation of filter equipment to control emissions from a cupola. The system includes adequate temperature elevation and residence time for gases to obtain proper incineration of hydrocarbons.

Elevated levels of metals in yard soil at the Manchester Public School, Cambridge, were the cause of considerable public concern. The elevated levels were due to long-term emissions from an adjacent brass foundry. Neither the Ministry nor staff of the Occupational Health Branch of the Ministry of Labour could establish a hazard and blood tests of the school children and teachers showed acceptable levels for metals. The school board eventually replaced the soil and re-sodded the yard. Ambient air monitoring also showed acceptable levels of metals.

The disposal of PCBs and other hazardous wastes continued to be a problem. The Canadian General Electric Company at Guelph was to provide a suitable PCB blend for a trial burn at St. Lawrence Cement in Mississauga. Since the burn was cancelled, a warehouse was constructed for PCB storage. A proposal for an interim storage facility for PCB wastes in Middleport, Brant County, met with much public resistance. A local citizen's group was organized to oppose the storage of these wastes in their municipality and a citizen's information committee was set up to keep area residents informed on all aspects of the development of the proposal.

The paper mills operating in the Niagara Region maintained abatement schedules as required by their respective Control Orders and Program Approvals. The Ontario Paper Company continued a major expansion and modernization project to be completed in 1982.

General Motors commenced construction on a major plant expansion.

Much public apprehension was evident concerning an approval granted to Frontenac Chemical Waste Services Limited to operate a waste oil and solvents fuel storage tank in Welland. The company did not proceed with the proposal.

An industrial waste solidification facility was proposed for the Walker Brothers Quarry site for which environmental hearings will be required.

Both Atlas Steels and Inco Limited proceeded on schedule with multi-million dollar liquid waste treatment facilities. Cyanamid (Welland Plant) also maintained the required abatement schedule.

Municipal and Private Abatement

A number of important expansions of existing water treatment and sewage treatment plants in the Region were completed during the year. These expansions will enable continued residential and industrial development in the larger cities of Waterloo Region and the City of Guelph. New water and sewage facilities were completed in the Village of Ayr. Sewage plant expansions were under way in Shelburne and Elora at year-end and were being planned for Elmira and New Hamburg. The communal sewage facility in the Police Village of St. George is to be completed in 1980-81.

The Dundas sewage treatment plant was expanded from 2.5 to 4 million gallons per day in late 1978. At year-end, Ministry staff were reviewing plant performance data and records to determine if all performance parameters for effluent quality were being met for discharge into Cootes Paradise. This was a subject of great public concern at the time of the hearings for this plant.

The Woodward Avenue plant in Hamilton was expanded from 60 to 90 million imperial gallons per day. One objective of the expansion was to improve the degree of phosphorus removal at the plant. At year-end, a consulting engineering firm was conducting a study to determine the new plant's treatment capabilities and set operating criteria to provide the most effective treatment.

In Niagara, the regional municipality was very active in undertaking many sewage and water construction projects, including the Smithville water softening facility, the Welland water treatment plant expansion and the Port Colborne sewage treatment plant. The sewer rehabilitation program in Port Colborne was initiated and was deemed successful. The City expects the program to continue. In Fort Erie, the Rosehill water treatment plant was virtually completed at year-end.

In waste management, efforts are continuing to close out small, inefficient sites and encourage the establishment of properly engineered and managed larger sites. Unfortunately, it is a lengthy arduous process to establish new sites today and municipalities are faced with the need to start planning for them many years before they will be needed.

Regional Hamilton-Wentworth has received a favorable decision regarding the Glanbrook Landfill site from both the Ontario Municipal Board and the Environmental Assessment Board. The decisions were subject to a number of conditions that must be met by the Region prior to use of the site. At present, Ministry staff are reviewing the plans and other information submitted by the Region in their attempts to fulfill these conditions so that disposal operations may commence by September 1980.

Methane gas from the closed Ottawa Street Landfill site in Kitchener was discovered in basements of nearby new-housing units in 1976. Since that time, the Regional Municipality has installed forced venting systems and a gas burner. At year-end, the Municipality was looking at utilizing this gas as an energy source. In Niagara, due to the increasing difficulty in obtaining new landfill sites, the Regional Municipality was exploring the possibility of establishing a regional incinerator project to provide waste heat to a local industry.

The implementation phase of the Ministry's new sewage sludge utilization program was well under way in 1979-80 and no major problems were encountered. A lack of approved sites to dispose of the sewage sludge may pose future problems.

The value of the Grand River as a source of water supply was reinforced by commencement of an experimental artificial recharge project at Mannhiem, whereby river water will be pumped into abandoned gravel pits to recharge the groundwater supply. In addition, an infiltration gallery was constructed on the banks of the Grand River near Breslau to supply additional water to the City of Kitchener. To some degree, the success of these and similar projects may depend upon the outcome of any decision to construct the West Montrose Dam.

Air Quality

In Hamilton, after a significant improvement in air quality during the 1970-75 period, the trend levelled off, and, up to 1979, levels remained relatively stable. Except for occasional odour problems in the vicinity of heavy industry, the main problem continued to be airborne dust. Suspended particulate levels were still elevated well above objectives near the industrial area, although most of the City showed generally acceptable levels. One notable observation has been the lack of any improvement since 1970 in dustfall levels (re-entrainment by road traffic may be a factor).

During 1979, there were 22 instances in which the Air Pollution Index (API) in Hamilton reached or exceeded 32, all during inversions. In the few years prior, seven to ten such incidents took place, none of which matched the severity or duration of some of the 1979 occurrences. The API reached 50 for the first time since 1970. This apparent deterioration of air quality did not, however, represent any increase of industrial emissions; rather, it simply reflected increased instances of poor atmospheric dispersion. However, these events do indicate that the entire City is still very susceptible to periods of high pollutant levels, usually during Spring and Fall.

At Nanticoke, air quality generally remained well within acceptable levels, and, in 1979, the Nanticoke

Environmental Management Program (NEMP) completed its first full year of monitoring with a network of automated instruments.

Throughout the Region, ozone levels showed a marked decrease in excessive levels in 1979, probably due to a relatively cool Summer that was not conducive to oxidant formation. Other parameters generally remained unchanged and at acceptable levels, except for local problems in Ayr, Cambridge, Chippawa, Thorold and Welland, which must still come under control.

Two new API stations were established in Niagara Falls and St. Catharines in 1979; no incidents above the advisory level were recorded in either case.

Water Quality

The major portion of the West-Central Region is drained by the Grand River and its tributaries. The river is used for recreation, waste assimilation and water supply. The management of this entire watershed is of great importance, since the interaction of water uses can affect one another.

The involvement of staff with the Grand River Implementation Committee continued as in previous years. The major environmental assessment on water control structures in the Grand River, as commissioned by the Grand River Conservation Authority (GRCA), was reviewed by the West-Central Region. Staff undertook waste assimilation studies in the Grand River Basin at Wellesley, Baden and New Hamburg on the Nith River system, and Elora and Fergus on the Upper Grand River. Other watersheds—the Lynn River at Simcoe, Big Creek at Delhi and the Credit River at Orangeville—were assessed for waste assimilation capacities.

A major study of the Confederation Park area of Lake Ontario, regarding urban runoff and bacterial pollution, was completed. The monitoring of Cootes Paradise water quality subsequent to the Dundas Sewage Treatment plant being expanded was also continued. The study on Hamilton Harbour took on a new slant during 1979-80, with emphasis on urban runoff and other inputs to the Harbour and the effects these inputs are having on water quality.

Several major hearings were attended during the year, notably the Glanbrook Landfill site hearings for Hamilton-Wentworth, the hearing on the SCA chemical waste discharge to the Niagara River in New York State, as well as numerous OMB hearings to which staff were subpoenaed.

Environmental assessment reviews were carried out for other proposals such as the Haldimand-Norfolk Regional Sewage Scheme study, Class Environmental Assessments for other ministries, as well as routine evaluations requested by other sections. The routine surface water quality monitoring program was maintained. Several major groundwater interference programs and investigations were also carried out, the largest in the vicinity of the City of Port Colborne.

Utility Operations

The Utility Operations Section was responsible for the operation of 30 municipal sewage treatment systems and five water treatment and supply systems. Included were five sewage collection systems and four water distribution systems. One new water system and one sewage system were commissioned for operation in Ayr.

Southeastern Region

Director: R.E. Moore

Industrial Abatement

The Industrial Abatement Section investigated 178 spills and 566 complaints, made 829 general inspections and assisted in the processing of 239 Certificates of Approval.

Installation of equipment and other modification or improvements made to plants include significant undertakings by C.I.P. (Hawkesbury), Courtaulds (Cornwall), Caldwell Linen Mills, Lake Ontario Cement (Picton), Canada Starch (Cardinal), Domtar Wood Preserves (Trenton), Black Diamond Cheese (Belleville), Dupont (Maitland), C.N.R. (Belleville), Ottawa Fibre Industries, Andrew Jergens (Perth), W.R. Barnes and Canada Veneers.

Nine Orders, Requirements and Directions, Reports and Prosecutions were carried out during the year.

Routine inspections took up the majority of time in field work, with emphasis on dust and noise from mineral industries such as quarries, crushing facilities and smelters. Considerable time was spent responding to spills and complaints, preparing for Environmental Appeal Board hearings and issuing Control Orders.

Abatement of a problem with the Cornwall sewage system was initiated with four industries that agreed to monitor and control discharges not in compliance with the sewer use bylaw. A persistent H_2S problem was identified and will be reduced.

Excessive BOD and suspended solids discharges, which have plagued the dairy industry, were under investigation at year-end, in addition to odour problems associated with whey.

Gasoline contamination of wells from leaking tanks in service stations continued to be a problem.

Municipal and Private Abatement

Resources were primarily expended in inspection and abatement activities associated with waste disposal sites and water works and in investigating complaints. Increased action with respect to waste disposal sites resulted in the closure of four sites and improvements to a number of others. It is expected that this concerted abatement effort will continue. Part 7 continues to be very manpower intensive in the Ottawa District.

The Private Services Funding (PSF) program (i.e. the Low Cost Alternative Program) demanded more

attention during the year and will become a major drain on resources in the near future. It is anticipated there will be more than 60 PSF projects in the Region in 1980-81. This program, along with the analysis of a number of well complaints, has highlighted the need for more rigorous control of well drilling activity within the Region. Accordingly, inspections and educational programs concerning well drilling will be given more emphasis in 1980-81.

Very few problems were encountered with pleasure boats, marinas and ice fishing activities. As a result, these inspection routines will be reduced in 1980-81 so that more manpower can be alloted to the PSF and well drilling programs.

There was a marked increase in the number of public inquiries for general information about pesticides. This growing awareness signals the need for citizen education. Bats and European earwigs are becoming a major concern and will require increased effort in the future.

Storm water management continued to be an important activity. In Cornwall, the storm water study was completed and an overall pollution control strategy process was initiated. A contract was awarded for phase one of the Rideau River Storm Water Management Study, which will include a review of existing data and a delineation of sampling programs. The report is expected in the Fall of 1981.

Air Quality

The Air Quality Assessment Group conducted several special sampling surveys to assess airborne arsenic hazards at Deloro and Kingston and fluoride emissions in Gloucester Township. The latter survey involved a measurement of gaseous and particulate fluoride in the vicinity of a clay brick manufacturing plant, both during plant shutdown and during full operation.

A semi-permanent total reduced sulphur (TRS) monitoring station was installed in an area of high complaints near a fine paper mill. The company involved absorbed the costs of securing the site and paid for telemetering the instantaneous TRS results to the plant control centre. The station allows for more effective abatement strategies to be employed by the plant operators.

All data from air monitoring stations in Ottawa and Cornwall are being telemetered to Toronto and the City of Cornwall is being provided, as requested, with an up-to-date monthly report on air quality.

Water Quality

The Region's lake trophic survey program continued with the sampling of 12 recreational lakes. Monitoring of lake trophic status was carried out on an additional 71 lakes through the Cottagers Self-Help Program. Intensive sampling of a further 25 lakes was undertaken in conjunction with the Acid Precipitation in Ontario Study. Water quality monitoring continued at 170 river monitoring stations.

Staff investigated 17 interference and 60 contamination complaints concerning water supply. Additionally, 73 waste disposal sites and 22 sand-salt piles were investigated for groundwater contamination and 46 municipal water supply and/or waste treatment facility expansion proposals were reviewed. Reports were prepared dealing with arsenic contamination in the Moira River, the Cottagers Self-Help Program for 71 lakes and the sensitivity of 52 lake trout lakes to nutrient inputs.

Environmental Planning

The Region handled 1,881 requests regarding official plans and amendments, zoning bylaws, environmental assessments, certificates of compliance, ODC/DREE applications, water and sewage works applications. There was a decline in all aspects of land use with the exception of zoning bylaws. However, the decline was more than offset by a significant increase in the number of approval applications processed and in services (such as population projections) provided to other sections.

Laboratory Operations

The Regional Laboratory in Kingston continued to increase the diversity of its analytical service, while reducing the total number of tests performed. More emphasis was placed on in-plant testing, with assistance provided to the water and sewage plants wishing to perform their own control tests.

New tests were added in support of the acid precipitation program. A coliform test specific for E. Coli was also introduced to better identify the source of waste inputs. Fluoride analysis capability was added to support work done by the Health Units in this Region and to support their quality assessment activities.

In the Microbiology Section, the number of samples examined increased slightly from the previous year, but the test load was reduced 7.5 per cent by more appropriate test selection. In chemistry, the test load was reduced 10 per cent due mainly to a reduction of activity in surface water assessments.

Utility Operations

The Ministry has been operating an arsenic removal plant at Deloro since April 1979 under a Ministerial Section 99 Order to prevent degradation of the Moira River system. The plant is located on the site of the abandoned smelter owned by Erickson Construction Limited (formerly Deloro Smelting and Refinery Company Limited), which declared it could not operate the treatment facility for lack of sufficient funds.

The plant was found to be in extremely poor condition. It was concluded that the Ministry's objective for the arsenic in the Moira system could not be obtained without upgrading the plant and repairing leaks in the site drainage collection system. Additional steps to improve chemical addition, flocculation and settling, and lab control were also instituted. The arsenic sludge was thoroughly cleaned out of the ponds and transferred to a protected holding site. In September 1979, a writ was served on the company to recover the costs incurred by the Ministry in operating the treatment plant. The Courts ruled in favor of the Ministry in March 1980.

Meetings with municipalities to discuss transfer of operating responsibilities for Ministry water and sewage projects remained notably unsuccessful.

The new Killaloe Station WPCP went into service in late 1979, thereby providing treatment for the Village and eliminating the source of residential-well contamination in the Village.

Southwestern Region

Director: D.A. McTavish

Industrial Abatement

The Southwestern Region experienced about 30 incidents of liquid manure contamination of streams, resulting from spills or unsatisfactory operating procedures at intensive livestock farms. Many of the spills resulted in extremely serious fish-kills, including a virtual wipe-out of all aquatic organisms in the streams. An extensive informational program was carried on through the following Winter to ensure that farmers throughout the Region were made aware of the seriousness of the situation, the lethal character of liquid manure, and the measures necessary to avoid future manure spills.

BASF Wyandotte, a chemical company operating in Michigan, is using Fighting Island in the Detroit River for the disposal of solid waste resulting from their processes. As a result of the identification of elevated levels of chlorinated organic compounds in the eggs of herring gulls found on Fighting Island, the Michigan Department of Natural Resources and the Canada Wildlife Service expressed concern that these waste-settling beds might be a source of persistent organic compounds. The MOE has undertaken an extensive sampling program to determine if significant organic materials are deposited on the Island. Thus far, no unusual concentrations of compounds of concern have been found in the solids deposited on the Island, in the effluent discharged from the Island, or in the sediments of the Detroit River in the environs of the Island.

Regional staff have assigned responsibilities in the event of a release of radioactive material from the Bruce Nuclear Power Development, which has a potential to cause off-site effects. A comprehensive training program was conducted to familiarize the field-response teams with site facilities, the surrounding terrain and appropriate sampling techniques. Subsequently, the Region participated in an exercise designed to evaluate the effectiveness of the provincial contingency plan for nuclear accidents.

In accordance with the Memorandum of Understanding exchanged between Governor Milliken and Premier Davis, the Ontario Ministry of the Environment collaborates with the Air Pollution Control Divisions of the Michigan Department of Natural Resources and the Wayne County Department of Public Health to integrate several aspects of air pollution control programs in their respective jurisdictions along the boundary area from the head of the St. Clair River to the mouth of the Detroit River. A study was undertaken to identify sources of potentially toxic gases that could be released in the event of an accident or spill and have transboundary significance in terms of risk to the exposed public. Steps were taken to ensure that contingency plans of the sources involved included a commitment to immediately notify the police in the neighboring jurisdiction in the likelihood of toxic gases being transported across the international boundary.

A rural site in Moore Township was used in the late 1950s for the disposal of sludge-like material from industries in the Sarnia area. When use of the site was discontinued, the site was not satisfactorily covered to ensure containment of wastes. Upon MOE investigation the present owner was ordered to correct the situation. At year-end, some of the specific requirements set out in the Order were under appeal by the owner.

Municipal and Private Abatement

Effective April 1, 1979, the Ministry of the Environment accepted full responsibility for the private sewage program in Lambton County, subsequent to a decision by the Lambton Health Unit to terminate its agreement with the Crown. During 1979-80, 300 sewage system applications were received and processed. Certificates of Approval were granted in all but ten instances. No appeals were filed with the Environmental Appeal Board respecting the ten applications for which approval was denied. Also, as part of this program, 239 severance applications involving 473 parcels of land were inspected, and written reports were submitted either to the Lambton Land Division Committee or to the appropriate local Committee of Adjustment.

Due to widespread public concern Ministry staff undertook the creation of guidelines to be applied throughout Lambton County for the installation of septic systems. Lambton County is a difficult area in which to place septic tanks. The soil generally displays very low porosity and innovative design is required. Overall, the public was extremely co-operative in dealing with Ministry staff and the lack of appeals would appear to indicate that most public concerns were being satisfactorily addressed.

As a result of extensive water quality sampling and a hydrogeological investigation, it was determined that one of Ingersoll's municipal wells was probably being contaminated by a nearby industry. The well water contained high levels of fertilizer products similar to the types being manufactured or mixed at the local industry, which agreed to replace the municipal well entirely at its own cost. The municipality agreed to deed the existing contaminated well back to the industry.

During the Summer of 1979, City of London municipal employees went out on strike. This strike resulted in a termination of all municipal services, including the collection of garbage and the operation of the sewage treatment plants. The City had, in consultation with the Ministry of the Environment and the local Medical Officer of Health, requested assistance

in the establishment of temporary landfill areas throughout the City. These landfill sites or temporary storage areas were used by residents until the strike was over and a complete clean-up was effected. The sewage treatment plants were effectively run by management staff of the City. Stepped-up monitoring of the sewage treatment plant effluents by Ministry staff revealed that no deterioration of the effluent took place. However, severe odour problems were created in the vicinity of the Greenway sewage treatment plant because management staff were unable to operate the sludge incinerators. As a result, sludge cake had to be stored in the open air within the sewage treatment plant property, which resulted in noxious odours being produced over a large area of the City. The odour persisted for some weeks after the strike, while the sludge was being cleared.

The Ministry-owned and-operated sewage treatment plant serving the Town of St. Mary's has been severely organically overloaded (principally by food processing wastes) since July 1979. Improved housekeeping by local industries did not totally reduce the loading to acceptable levels. Consequently, the Town of St. Mary's hired a consulting engineering firm to study the problem in detail and recommend remedial measures. A new industrial waste bylaw was prepared to better control the industrial loading, and the consultant recommended expansion of the sewage treatment facilities. It is hoped that in 1980-81 this problem can be resolved with none of the industries leaving St. Mary's and the Town of St. Mary's not being forced to accept an undue cost burden in order to treat industrial wastes.

The Township of Collingwood is used extensively for recreation by residents throughout Southern Ontario. As a result, there has been considerable pressure for development in the area and the Ministry has undertaken to assist the municipality with its Up-Front Grant system in the establishment of both water and sewage service systems.

During 1979-80, extensive discussions were held with 1) a consulting firm charged with the design of the system, 2) developers in the area, 3) the Town of Collingwood, and 4) the Township of Collingwood in order to outline the grants available and attempt to have the works undertaken as quickly as possible. Full agreement on all matters had not been reached by year-end, but Ministry staff had completed sufficient reviews to determine the best means of servicing the area to minimize any environmental impact. These projects are to be undertaken in the near future.

In April 1976, the Ministry recommended that the Derby landfill site be closed out as soon as possible (the site was contaminating area groundwater supplies). Since then, the City of Owen Sound has been seeking approval of a new site on North Half Lot 28 and Lot 27, Concession B, Sydenham Township. Approval was still pending at year-end. The City monitored water quality in neighboring water wells at the Derby site; no further quality deterioration was observed. However, the extent and direction of the contamination plume is not known and must be established to ensure proper closure and long-term protection of the surrounding aquifers. Detailed investigations are to be undertaken during 1980 by the City's consulting hydrogeologist to provide recommendations on site closure and plume containment.

Air Quality

During 1979-80, the **Air Quality Assessment Unit** maintained 75 monitoring sites collecting pollutants over 30-day periods, 66 instruments collecting total suspended particulates for 24-hour or 72-hour periods and 73 continuous air monitoring instruments. The goal of achieving 90 per cent valid data was surpassed, based on the collection of close to 600,000 measurements. These data were used to prepare formal reports on air quality for Windsor and Sarnia and a report covering the Michigan-Ontario transboundary air pollution area. The Ontario Air Pollution Index was provided for Windsor and Sarnia.

Continuous monitoring for radioactivity in total suspended particulates was expanded in the vicinity of the Bruce Nuclear Power Development site. Background monitoring for radioactivity was initiated in southwest Essex County, which is close to a nuclear generating plant in Michigan. A special study to determine the impact of particulates in the Beachville area was continued and a formal report was issued. More intensive sampling was conducted for particulates in the vicinity of the St. Mary's Cement Company, St. Mary's.

Appreciable improvements were made in respect to instrument performance and safety.

Water Quality

The **Water Resources Assessment Unit** completed 28 reports of memoranda outlining water quality assessments for establishing waste control requirements for surface waters throughout the Region. Major reports included a biological documentation of the St. Clair River; watershed studies of the Avon River, Bayfield River and Lucknow River; and sewage effluent plume studies in London and Walkerton. Fifteen surveys were conducted on rivers or lakes, including a major benthic study of the western basin of Lake Erie. Specialized efforts included sampling for PCBs in the Detroit River (Fighting Island), at the Meaford landfill site and in Pottersburg Creek (London); sampling for mirex and PCBs in Kettle Creek; and assistance to the Water Resources Branch in aquatic plant studies on the Mary Ward Shoals (Georgian Bay). The water quality monitoring network was sustained, based upon the collection of monthly samples at 130 stations. Surveillance of approximately 30 recreational lakes in Grey and Bruce Counties was also maintained. Continuous records for dissolved oxygen and temperature were obtained at seven stations and streamflow measurements were taken regularly at 25 stations during Summer and Fall.

Staff investigated more than 30 fish kills and assessed two surface water flow interference complaints.

Construction of an experimental marsh treatment facility at Listowel commenced, with an anticipated completion date of July 1980.

The Avon River report precipitated the Stratford-Avon Environmental Master Plan study, which will encompass two years of intensive sampling and demonstration projects to establish the most cost-effective approaches for meeting water quality objectives in the Avon River.

Water Resources staff were involved with numerous other complaint investigations, reviews of marine construction proposals, official plans and amendments, subdivision proposals, Permits To Take Water, pump tests and various development proposals. Effluent requirements for Certificates of Approval for several new sewage facilities were defined and forwarded to the Pollution Control Branch.

Seventy-nine complaints of well water supply contamination were investigated and evaluations of 34 groundwater quantity interference complaints were made. Many complaints involved extensive field investigation and long-term monitoring. Reports and correspondence were forwarded to all complainants and, in some cases, to MPPs and to the Ontario Ombudsman.

Assistance was provided to the Municipal and Private Abatement Section in the evaluation of the groundwater impacts of numerous developments and waste disposal sites, including 45 subdivisions, 21 aquifer tests, 29 sanitary landfill sites and eight sewage treatment and disposal operations.

Comments were provided to Approvals and Planning on the potential groundwater implications of approximately 120 official plan amendments, 25 environmental assessments, 28 Permits to Take Water and 24 pits and quarries applications.

Operation and maintenance of automatic recorders on 33 observation wells continued in order to assess groundwater level fluctuations. In addition, manual measurements were taken in some ten other wells to monitor conditions at specific sites.

Under the Water Well Program, staff inspected 2,439 wells and pump connections (where present) and reviewed and corrected an equivalent number of water well records. Water well locations were plotted on permanent maps. The reduced number of defects (24 per cent) indicates the significant progress being made with this program.

General information, primarily from water well records, was provided in response to 400 inquiries.

Approvals and Planning

The **Approvals and Planning Unit** co-ordinated and provided regional input to the review of 158 plans, amendments and zoning orders circulated by the Ministry of Housing and forwarded written responses on all submissions and follow-up correspondence. The Unit performed a similar function with respect to 60 development proposals circulated by municipal planning departments and six applications received from the Niagara Escarpment Commission. In addition, the Unit prescreened numerous municipal zoning bylaws for servicing and/or environmental implications prior to circulation to the appropriate district offices.

The Unit co-ordinated and provided technical support input to the Region's response on 19 reports relating to sewerage and water supply distribution systems. Nineteen applications were processed for Certificates of Approval ensuring compliance with air quality requirements and 233 permits were issued for water takings.

The Unit co-ordinated the Region's review and forwarded comments on 70 submissions circulated by the Ministry of Natural Resources under the Pits and Quarries Control Act and the Lakes and Rivers Improvement Act. Regional input was provided on 27 undertakings falling within the category of environmental assessments, ten of which were formal.

The Unit provided input on the water quality implications of fish hatchery operations, the Lambton County Official Plan, the review of conservation authority watershed plans, the updating of four sections of the land use planning handbook, the implications of new planning legislation. The Unit completed preparations for a plan review workshop for district office staff.

Laboratory Services

The London Regional Laboratory performed 166,382 chemistry tests on 17,205 samples and 43,416 microbiological tests on 16,011 samples.

Assistance was provided to several pollution control plants to resolve sludge bulking and actinomycete-foaming problems.

A program designed to assess salmonella discharges from red meat and poultry industries was completed. The efficiency of destroying this pathogen by activated sludge treatment and disinfection was also evaluated.

An improved method of fecal coliform recovery by substituting m-Tek Agar instead of MacConkey was instituted.

The weighing and calculating associated with "Solids" analysis was automated by combining a Radio Shack TRS-80 micro-computer with a mettler HL52 balance.

Utility Operations

One tertiary sewage treatment plant and two sewage lagoon facilities (with collection systems) and two well and water distribution mains projects were completed in 1979-80. A further eight projects were under construction at year-end.

Responsibility for the Chatham Water Pollution Control Plant, with a staff of 12, was transferred to the City Council. Contact was maintained with municipalities capable of operating the projects serving them. Efforts to effect further transfers from the Province to the municipalities were not successful. The municipal councils are satisfied with the operational expertise available from the Ministry and realize that they have effective cost control through the annual budget approval and rate review processes at the local provincial-municipal liaison committee level.

Ministry-owned and-operated water treatment plants and pipelines and sewage treatment plants provide service to 123 municipalities in the Region.

Laboratory Services Branch

Director: G.C. Ronan

The Laboratory Services Branch provides the analytical support that serves as a basis for the Ministry's pollution abatement and environmental quality assessment programs. In 1979-80, the continuing interest in the environmental and possible health effects of toxic organics resulted in increased demands on the laboratory's organic analytical capabilities. There were concommitant minor reductions in the requirements for inorganic, microbiological and pesticides analyses, thus continuing the trend towards a more selective approach to the consumption of analytical resources.

The Laboratory User's Committee continued to act as a regulator on the analytical requirements of the diverse sampling programs carried out by abatement and assessment groups, and regional and management program chiefs voluntarily cut back or held their analytical requirements to the level of the previous year.

Branch Organization

The Branch underwent a major organizational change during 1979-80. The four main units of the Physical Methods Section, which had been formed in 1976, were separated and integrated into other sections within the Branch.

The X-ray Unit and the Complaint Analysis Unit were integrated into the Air Quality Section, which was renamed the Inorganic Trace Contaminants Section. The Radioactivity Unit and the Electron Microscopy Unit were merged with the Water Quality Section. (For the purposes of this report, the workload performed by these integrated groups is presented as if the Physical Methods Section was extant.)

As a result of the re-organization, the Branch consisted of six sections at year-end:

1. The Water Quality Section provides routine water and wastewater quality testing.
2. The Inorganic Trace Contaminants Section conducts elemental and inorganic analysis on air, water and biological samples.
3. The Pesticides Section provides routine and non-routine pesticides and other organic analysis on all types of environmental samples.
4. The Organic Trace Contaminants Section conducts routine and complex organic analysis on water, air and biological samples.
5. The Microbiology Section determines bacterial levels in waters and wastewaters, identifies microorganisms and conducts microbiological assessment of the mutagenicity of pollutants.
6. The Administrative Section provides personnel, finance and general administration; operates the Laboratory and Research Complex safety program; and administers the Central Stores for the Ministry.

Three regional laboratories in Thunder Bay, Kingston and London perform general chemical and microbiological analyses in support of regional programs in the Northwestern, Southeastern and Southwestern regions respectively.

Tests Performed

The Toronto and regional laboratories performed 1,590,000 tests during 1979-80, a total within 7 per cent of the 1978-79 workload. The Toronto laboratories conducted over 1.1 million tests or 72.5 per cent of the total test load. The regional laboratories increased their share of the workload over 1978-79. The Thunder Bay laboratory conducted 6.5 per cent of total testing; the Kingston laboratory, 8 per cent; the London laboratory, 13 per cent. Table 1 provides a comparison of test production by the various laboratory sections and regions during 1979-80 and 1978-79.

Programs and Laboratory Clients

Nearly 65 per cent of the tests performed in the Toronto laboratories were in support of regional activities. Diagram 1 (appendices) compares relative test inputs from the various clients for the combined regional/Toronto laboratories.

Non-regional, or head office, programs accounted for about 35 per cent of the total chemical workload. Of these, the Air Resources Branch took up 2 per cent of the laboratory's resources; the Pollution Control Branch, 2.5 per cent, and Water Resources Branch, 24 per cent. Non-MOE programs, supporting MNR, MOE and various conservation and federal programs, accounted for 5 per cent of the laboratory's workload.

Numerous regional programs require analytical support. Some programs, such as phytotoxicological studies or air assessment programs, are accounted for within the region; others, such as routine river monitoring, are accounted for within the co-ordinating head office branch. For this reason, the Water Resources Branch appears to use a disproportionately large portion of the laboratory's capability.

The principal programs resulting in major laboratory requirements are: air and water assessment, sewage and waterworks monitoring and river monitoring (see page 60 appendices).

Diagram II (appendices) lists the significant MOE programs that require laboratory support.

Analytical Surveys

The principal analytical load this year, as in the past, was from routine programs required for the monitoring of water and air quality. The largest was the workload generated in support of the monitoring of sewage treatment and drinking water treatment facilities. Together, these programs accounted for over 400,000 tests which were used to monitor the efficacy of water and sewage treatment systems (both provincially and municipally operated). Water and air assessment programs each required about 100,000 tests. The water assessment program consisted mainly of stream and river sample analyses for routine chemical and metal parameters. The air assessment program was made up

TABLE 1:

TESTS PERFORMED: LABORATORY SECTIONS, 1979-80

LABORATORY	1979-80 Tests x 1000	% of Total 1979-80	1979-80 Tests x 1000	% Change 1979-80 vs 1978-79
Water Quality	648	41	678	-4.6
Inorganic Trace Contaminants	277	17.5	284	-2.5
Organic Trace Contaminants	52	3.5	48	+7.7
Pesticides	8	0.5	8.4	-6.3
Physical Methods	23	1.5	29	-26
Microbiology	136	8.5	140	-2.9
Total Toronto Laboratory	1,144	72.5	1,187	-3.8
London	210	13	192	+8.6
Thunder Bay	106	6.5	104	+1.9
Kingston	130	8	143	-10
Total Regional Laboratories	446	27.5	439	+1.6
Total Laboratory Services Branch	1,590		1,626	-2.3

mostly of high-volume filters requiring total suspended particulate loadings and associated metal/anion content. Some of the other large, ongoing surveys were the Great Lakes study, lakeshore capacity, industrial abatement and technical support surveys.

The high demand for the analysis of all types of environmental samples for hazardous materials continued. The increasing emphasis on toxic organic compounds was illustrated by two major surveys. In one survey, water samples from the Niagara River and drinking waters from the same general area were analyzed in response to findings of organic contamination in the Love Canal area and discharges from industrial treatment on the U.S. side of the river. No chlorinated dibenzodioxins or its precursor, 2,4,5-trichlorophenol, were found.

In the other survey, trace organics testing was used to help solve a mysterious taste and odour problem in the South Peel water distribution system. It was shown that epoxy resin used to repair the reservoir walls contained phenol, which was being leached out and chlorinated by residual chlorine in the finished water.

The Mississauga derailment required identification of inorganic and organic by-products during the emergency itself and in support of clean-up operations.

The use of fish as an indicator of water pollution continued but at a reduced rate. About 10,000 fish were analyzed for mercury; 2,700 for PCBs. This year's guide book, "Guide to Eating Ontario Sport Fish", was based on over 60,000 fish analyses.

The Sudbury Environmental Study moved into its final year and resulted in a major increase in test loadings in the laboratory. Stack and in-plume samples, a variety of air particulate filter surveys, and acid precipitation samples were analyzed for metals, nutrients and anions. The precipitation analyses became a part of the Acid Precipitation in Ontario Study (APIOS) which also requires the analysis of waters, fish and biota from acid-stressed lakes, as well as terrestrial vegetation and soil.

The Sludge Utilization Program was initiated in 1979-80. The program required the analysis of 11 metals and a number of anions on sludges being used as a soil additive.

Increased demand continued for analysis of landfill materials and sites. Lysimeter studies, leachate analyses, litigation samples and head gas required organic and inorganic testing.

Public complaint samples, or samples requiring identification of major or toxic components, increased in number.

For example:

- a deposition of black powder on offices in the Hamilton area was found to be carbon;
- a determination of methyl alcohol was made in the drinking water of a public school;
- a massive fish kill in the Ganaraska River was traced to polyurethane waste spill;
- the spotting of aluminum siding was investigated in an industrial area;
- a white material coating automobiles was noted at numerous locations and its source was traced to insect droppings;
- Sault Ste. Marie drinking water was analyzed for round worms.

Investigative Developments

The Pesticides Section built and commissioned a dioxin laboratory, for the determination of this highly toxic, persistent chemical in a number of environmental matrices. The dioxin laboratory relies on a high sensitivity GC-Mass Spectrometer and capillary column gas chromatography, as well as sophisticated, efficient clean-up and separation techniques.

Other developments in Pesticides included:

- development of a method for analysis of human adipose and serum samples for PCBs;
- continued analytical support of studies at the Dowling PCB spill site;
- identification and measurement of a broad range of industrial organics in effluents and sediment cores originating from industrial discharge to Fighting Island in the Detroit River;
- provision of analytical support to the Air Resources Branch for PCBs in stack gases and ambient air;
- development of instrumental and group separation techniques for high performance liquid chromatography.

The Microbiology Section continued its development of the Virology laboratory and Mutagen/Carcinogen testing. In the latter area, the Ames test was modified for use in testing the mutagenicity of volatile organic compounds concentrated from industrial effluents. In the Virology laboratory, methods were developed for the isolation of viruses from a variety of environmental samples, including waters, sewage effluents and sediments. A joint epidemiological study with University of Toronto was initiated.

Numerous special studies were carried out by Microbiology. Pollution-indicating bacteria were determined in surveys of Humber Bay, Hamilton Harbour and Confederation Park (Hamilton).

Other studies included:

- a study of several media types for 35°C plate count;
- development of a single-step procedure for fecal coliform enumeration;
- evaluation of the Microtox Toxicity Analyzer system;
- development of the Rosenkrantz test, a bacterial system for the detection of DNA damage.

The Water Quality Section was involved in a number of field studies where analytical expertise was applied to on-site data acquisition for a variety of parameters, including residual chlorine and ammonia. Analysis of asbestos in air and water continued as a high priority activity. The Provincial survey of asbestos in drinking water resulted in the analysis of over 200 waters this year. Liquid scintillation continued to provide Limnology and Toxicology with lake productivity data based on C^{14} and P^{32} analysis.

Development work in the Water Quality Section was also at a high level during the year. Methods were developed for:

- tritium in drinking water;
- a new hot-block digestion for total nutrients;
- inflection point alkalinity;
- ammonia in anaerobic sludges.

In the Inorganic Trace Contaminants Section, lead, zinc and copper were each determined more than 20,000 times; cadmium, mercury, iron and nickel, each more than 15,000 times. This workload was expedited by reorganizing the Section and bringing two high-capacity instrumental techniques on-line. The multi-element techniques of automated atomic absorption spectrophotometry (AAS) and emission spectrometry (ES) permitted major improvements in analytical turnaround time and in the laboratory's capacity to determine metals.

At year-end, the inductively coupled plasma ES technique was being employed for the routine analysis of up to 12 elements on high-volume filters, sewage and sludge digests and acid precipitation samples. After similar preparation and instrumental development, waters, trade wastes and effluents were also being routinely analyzed with the computer controlled AAS system.

Other developments in the Inorganic Trace Contaminants Section included:

- speciation of arsenic compounds (As^3 and As^5), organolead compounds and various forms of cyanide;
- development of COH tape analysis for lead and iron;
- determination of metals in macrophytes and filamentous algae;
- simultaneous determination of several metals in dustfall samples.

In the Organic Trace Contaminants Section, there was a major equipment addition that added to the laboratory's diagnostic capability. A new Mass Spectrometer was brought on-line; its high sensitivity and superior library-searching capability resulted in a five-fold increase in the average number of identifications made on each complex GC/MS run.

Shipping and Stores

This year nearly $700,000 worth of chemicals and glassware were issued. Stores inventory levels remained at the 1,300-stock-item level, and 800,000 bottles and tubes were processed in the bottlewashing and sterilization area. Over one-half million items, consisting mainly of samples en route to the varous analytical sections, were handled by shipping and receiving personnel.

The shipping and stores area was renovated to accommodate the Laboratory Information System. The System will provide detailed analytical and sampling data to laboratory clients and will facilitate the Branch's record-keeping in terms of data log-in, bench producton data and quality control functions. In 1979-80, the functional specifications were delineated, tenders called, bids selected and by year-end, acceptance tests had been drawn up.

Other Activities

Quality control continued to be an important factor in all Branch operations. An estimated 80,000 additional tests were performed as part of a daily effort to validate and control analytical data being reported to clients. Numerous round-robins were initiated, or participated in, by branch staff; many standard reference materials were created or tested; inter-latoratory checks were performed as part of a continuous effort to systematize and maintain data quality control.

Laboratory personnel chaired and participated in numerous technical committees as Ministry representatives or as scientific resource staff. During 1979-80, staff prepared over 120 reports. Of these, 16 were presented at symposia or conferences; 11 were released as official MOE publications; nine were published in technical journals; the remainder were made available as technical reports.

The laboratory newsletter, Analysis, continued to provide information on Branch developments and projects and readership interest continued to grow. By year-end, circulation had risen to 700 copies per issue and copies were being mailed to all provinces and to ten countries in North America, Europe and Africa.

A symposium on progress in environmental analysis was held at the Laboratory. Twelve papers on all aspects of environmental analysis were presented by laboratory staff to an audience of government and university scientific staff.

finance and administration division

Executive Director: G.E. Higham

This Division provides a complete range of support services and control functions to the operating Divisions required for the efficient operation of the Ministry.

Financial and Administrative Services Branch

Director: W.D. Wood

Accounts Payable

The Accounts Payable Section processes for payment all supplier accounts, grants, subsidies and employee travel expense claims. In 1979-80, 116,900 lines of input were processed for budgetary expenditures amounting to $83.2 million and disbursements and charges amounting to $139.5 million.

During the year, the payment system was automated to integrate cheque production with the financial reporting system.

Financial Reporting and Control Services

The Financial Reporting and Control Services Section is responsible for maintaining and improving a comprehensive financial information system for the Ministry. This Section is also responsible for the financial and budgetary control functions for all Ministry revenues and expenditures as well as cashiering and cheque distribution services.

Several major enhancements to the existing financial information systems will result in more up-to-date and detailed information for the benefit of line management of the Ministry.

COBIS Support Group

Towards the end of the year, arrangements were made to transfer the Common Object Business Information System (COBIS) Support Group from the Ministry of Treasury and Economics to the Ministry of the Environment. The COBIS Support Group provides system analysis and computer programming services for the maintenance and development of COBIS, which is a financial information system used by nine ministries and agencies of the Ontario Government, including this Ministry.

Purchasing

During the year, 9,782 requisitions were received

and 9,136 purchase orders processed for a total value of $28.7 million.

Office Services

The Office Services Section maintains services to the Ministry in the following areas: the allocation of accommodation and parking, the procurement of printing, records and forms management, mail and messenger services, stockroom functions, the Policy and Procedures Manual, insurance liaison and telecommunications services. The Section also administers the photocopier control program established by Management Board in August 1977 which has resulted in savings estimated at $35,000 per year.

Systems Operations

The Systems Operations Section operates various Ministry computer systems and provides key entry facilities, data base administration, "on demand" information retrieval programming, Remote Job Entry (RJE) and security services.

In 1979-80, new responsibilities included the Liquid Wastes Waybill System and the expanded Capital Monitoring System. In the same period, the computer data security system, Resource Access Control Facility (RACF), was implemented.

Capital Financing

Manager: C.D. Mialkowsky

Significant activities include the financial management of the Province's investment in water and sewage works facilities, cost sharing agreements and grant programs.

Water and Sewage Works

Financial management was provided for 750 projects under agreements with municipalities and industry. The schedule below provides an analysis of financing under 500 Term Loan Agreements and also for 250 Provincially owned works under Service Agreements. In most cases, the water and sewage plants were also operated by the Ministry. The statutory and contractual activities in this area include the accounting and reporting aspects, conducting 115 water and sewage rate reviews (90 in 1978-79), assisting municipalities in implementing billing and collecting systems and bylaw reviews. The Gross Revenue generated by these activities amounted to $74 million in 1979-80 ($72 million in 1978-79).

Investment in Water and Sewage Works as at March 31

	1980	1979
	($ Millions)	
Term Loan Agreements		
Water Works	36.1	36.8
Sewage Works	58.2	58.7
Service Agreements		
Water Works	298.5	281.6
Sewage Works	668.9	598.2
Total Investment*	1,061.7	975.3

*at cost less recoveries

Cost Sharing Agreements and Grants

Administration of claims under the Canada/Ontario cost sharing agreements resulted in reimbursement of expenditures of $890,000 ($783,000 in 1978-79).

Loans from the Canada Mortgage and Housing Corporation amounted to $42 million ($63 million in 1978-79).

Provincial Assistance on projects under Service Agreements amounted to $31.7 million ($43.7 million in 1978-79). Direct grants to municipalities amounted to $42.2 million ($27.5 million in 1978-79).

Systems Development

Manager: G. Scanlon

In 1979-80, the Systems Development Section worked on a wide variety of projects with Ministry Branches and Regions.

The utility rate information system was expanded to include additional reports and optimized to improve operating efficiencies.

The development of the hazardous contaminants inventory system for the building of the hazardous substances cross-reference file and the creation of the industry description and contaminants inventory files was completed. A limited amount of data was entered and processed in the system for de-bugging purposes. In 1980-81, the building of the files will continue, while the development of the generalized reporting Module will be undertaken.

The data acquisition and processing system (DAPS) was put into operation for the Nanticoke environmental management program. The system includes monitoring equipment in the field and the central computer in the Air Resources Branch. Additional SO_2 monitoring stations will be added in 1980-81. The model located in the central computer was also made operational. In 1980-81, adjustments will be made to perfect the predictive capabilities of the model for research purposes.

Modifications to the Grand River simulation model were completed to provide agreement between the model and field results in the calibration and verification runs. In 1980-81, long-term simulation runs will be conducted.

Development of the basic reporting aspect of the utility performance monitoring system, for both imperial and metric units, was nearing completion at year-end. Data for 1978 and 1979 was being entered into the system for editing and correction purposes. In 1980-81, the system will be expanded to include municipally operated plants in addition to Ministry-operated plants and performance criteria for planning purposes.

Development of the laboratory information system was nearing completion at year-end. Testing sessions were scheduled for early 1980-81.

With regard to regional data processing needs, a manual pollution abatement enforcement system was implemented, while work continued on the automation of the regional water quality surveys. In 1980-81, a regional data processing strategy will be developed covering both equipment and software development in order to minimize duplication and to take greater advantage of software development occuring at head office and in the regions.

Development of the industrial liquid waste waybill system continued. Waybills were being entered into both the Wang System and the computer system at year-end. Now available from the system are head office/regional reports and management reports detailing and summarizing waybill activity by source of waste, carrier, waste sites and types of wastes. In 1980-81, an intelligent terminal will be acquired for the entering and editing of waybills.

A committee of representatives from regional and head office branches was formed to develop the waste site information system. Design of the system was completed, while development of the waste site inventory portion of the system was under way at year-end.

Internal Audit Branch

Director: E.F. Heath

The Internal Audit Branch is a central support function responsible for providing management with objective assessments of the financial and internal controls under which Ministry programs and activities operate. The major audit responsibilities are as follows:

- to identify and evaluate the adequacy of financial and administrative control aspects of Ministry operations;
- to review the adequacy and reliability of financial data and reports used by management for payment and other decision-making purposes;
- to determine the accuracy of claims from outside agencies and municipalities in respect of grants and transfer payments;
- to assist management by performing an independent review of any area of special concern;
- to communicate findings, suggestions and recommendations in a manner which will encourage and support corrective and/or constructive actions by the managers within the Ministry in accordance with their responsibilities and authority.

During the fiscal year the Branch continued its multi-year program of conducting operational and financial audits in the Ministry offices and plants throughout the Province.

In addition, this Branch conducted a review of grant payments under the Up-Front or Direct Grant Program with a total expenditure of $33.7 million for the fiscal year. These grants provide financial assistance to municipalities and agencies towards over 170 sanitary and water system projects throughout the Province.

Information Services Branch

Director: R.J. Frewin

The activities of the Information Services Branch closely reflect current ongoing programs and new initiatives pursued by the Ministry.

The Branch continued to provide a full range of communications and public information services aimed at keeping the public informed of the Ministry's policies and activities. During the year the Branch produced and distributed 116 news releases, 25 statements and speeches, and a wide range of publications, reports, newsletters and both printed and audio-visual educational materials.

Publications

Cottage Country, an environmental manual for the cottager, was produced in co-operation with the Federation of Ontario Cottagers' Associations to provide a comprehensive guide to assist cottagers to preserve and protect the vacation envrionment. Through Federation and Ministry outlets, including regional cottager survey programs, 50,000 copies have been distributed.

The annual three volume "Guide to Eating Ontario Sport Fish" covering fish species in Northern, Southern Ontario and the Great Lakes was revised to include new test results, and 192,000 copies were distributed. The three guide books have been published for the fourth consecutive year as a part of Ontario's fish testing program conducted in co-operation with the Ministry of Natural Resources, and contain analysis for possible trace contaminants such as mercury, PCB, mirex and DDT. This Province-wide testing and information program is unique to Ontario and recognizes that every angler is entitled to know if it is safe for him and his family to consume the fish they catch. More than 50,000 fish from 878 Ontario water bodies have been tested and reported to date. Monthly bulletins on new test results are also issued.

Three new educational manuals were produced: the Citizen's Handbook series on Waste Management and Recycling, on Water Quality and Its Protection, and on Air Quality and Its Protection. Student newspapers, education fact sheets, teacher lesson plans, and elementary grade environmental education aids were also revised, reprinted and distributed.

Production of a major brochure on acid rain was commenced, with publication in English and French planned for the Fall of 1980.

Nearly two million pieces of literature were distributed. Most of the Ministry's 80 brochures and fact sheets were revised and up-dated. The Ministry now offers 27 publications in the French language. In addition, the Branch edited and distributed a number of technical and field reports.

Four issues of the Ministry newspaper "Legacy" were published and distributed to about 23,000 subscribers, with additional copies distributed at fairs and exhibitions.

Special Projects

The Branch assisted the Ontario Federation of Anglers and Hunters in launching "Pitch-In-Day", a successful one-day environmental event to clean up rivers, streams, shorelines, trails and backroads. An estimated 50,000 Ontarians participated and collected more than 200 tons of litter and junk. Promotional assistance in support of the OFAH program included advertising in all Ontario daily and weekly newspapers, TV commercials and news releases.

For the second year, results from "Operation Skywatch" were impressive. A squadron totalling 85 women pilots flew volunteer environmental patrols along the shorelines of the Ottawa River, St. Lawrence River and the Great Lakes. Skywatch is a joint venture of the Ministry and the Ninety-Nines Inc., the international organization of women pilots. The voluntary program has been expanded to include members in Toronto, Ottawa, Hamilton, London, Sarnia and Windsor. Information Services maintains regular liaison with Ministry regional co-ordinators of Skywatch, who provide the Ninety-Nines with film and equipment and direction for patrols.

The Information Branch, the Waste Management Advisory Board and the Packaging Association of Canada initiated a bi-annual packaging and design competition for post-secondary students to encourage designers of tomorrow to think in environmental terms and thereby reduce material and energy waste from packaging. Awards were presented at a Ministry exhibit of student design entries in conjunction with the "Pac-Ex" conference at the Industrial Building, CNE.

Displays and Exhibits

The Ministry was also represented by exhibits featuring resource recovery, garden composting of garbage, pesticide safety and other graphic displays and films at the Canadian National Exhibition in Toronto, the Central Canada Exhibition in Ottawa, the International Plowing Match, the Royal Agricultural Winter Fair, the Do-It-Yourself Show in Toronto, and exhibitions at Sudbury, Thunder Bay and Sault Ste. Marie. An estimated audience of 800,000 viewed these exhibits.

For the first time, the Branch operated a display at the Montreal Boat Show, known as "Salon Nautique". Information on Ontario's boating regulations was distributed in English and French in order to inform Quebec sailors about waste disposal methods and facilities in the use of Ontario waterways.

Public Meetings

Information "open houses", citizen information committee meetings, public meetings and project-oriented community education programs were conducted throughout the Province, largely as part of the Ministry's programs concerning industrial waste facility proposals and control programs. During 1979-80 the public affairs co-ordinator assisted in the planning, co-ordination and execution of 33 such public meetings.

The Branch also co-ordinated the opening of 10 sewage and water treatment systems. Water treatment plants were opened in Fort Erie, Mount Brydges, Ayr, Hearst and Mississauga. Water pollution control plants were opened in Petrolia, Wyoming, Killaloe Station, Ayr and Blind River.

Education

A highlight of the educational program was the completion of the film "Exploring Our Environment", which describes the Ministry's summer Environmental Explorations program in schools, provincial parks and private camps during June, July and August.

This touring environmental explorations program for schools, day camps, resident camps and provincial parks was dubbed KEEP (Kids Environmental Education Program) for the IYC year. Two crews of four university students toured the Province for 14 weeks, visiting 18 schools, 33 camps, 27 provincial parks and staged one professional development day for teachers. A total of 6,781 people were reached through the program with the "spin-off" effect expanding to approximately 24,000 children and adults.

The United Nation's observance of the International Year of the Child (IYC) was a highlight of the educational program. Six activities were completed including the production and printing of a special manual for parents and children entitled "Introducing Your Child to Nature". As well, the Ministry, in co-operation with the Ministry of Culture and Recreation and the North York Board of Education Forest Valley Outdoor Education Centre, produced an 80-slide, synchronized sound show, "Children and Nature", interspersing environmental outdoor education and the objectives of the IYC event.

The third annual workshop for special education teachers for handicapped children sponsored by the Ministry was staged at the Bolton Outdoor Education Centre with participation this year the highest ever. Sixty-six teachers attended the three-day workshop with the instructors and session leaders from outdoor education centres, conservation areas, universities and boards of education throughout the Province.

Films/Photography

Ministry films were used in 1,003 showings to 39,090 persons. In addition, five films were booked for 40 showings on television, where they were seen by an audience estimated at 530,400.

Branch staff prepared films, VTR and A/V slide shows on a range of activities including: acid rain, the Ministry as a corporation; the Rideau River Study;

Operation Skywatch; Metric Conversion; the York-Durham Water and Sewage Control System.

Branch staff also continued regular aerial surveillance and photography on behalf of Legal Services and the technical branches. The photographic reports and surveys obtained were used as exhibits at hearings and as evidence in Ministry legal proceedings.

Library

The Library Services Branch, consisting of both the main library at 135 St. Clair Ave. W. in Toronto, which serves Ministry staff and the public, and the laboratory library on Resources Rd. in Etobicoke, which serves the Ministry's scientific staff, responded to 10,309 reference questions, loaned out 18,955 books, and processed 41,975 photocopies of information material during the year. The libraries acquired 5,941 technical books and documents, subscribed to 260 journals which were widely circulated throughout the Ministry, conducted 1,085 computer searches for scientific material, and acquired 4,519 U.S. Government documents on microfiche.

A coin-operated photocopier was installed in the main library to increase the public's access to environmental information. A public reading room is planned for opening in the Fall of 1980 to accommodate the Ontario Government's policy on public access to information.

Personnel Services Branch

Director: R.E.B. Burns

The Personnel Services Branch was able to effect the Central Agency mandate to complete the broadbanding project in 1979-80 with the exception of certain positions in the general scientific module where standards had not been finalized by the Central Agency.

As a result of the broadbanding project, many Ministry positions that had been identified by classification as management positions, but whose duties did not meet the management exclusion criteria under the Crown Employees Collective Bargaining Act, were transferred to the Bargaining Unit. Incumbents of the positions going to the Bargaining Unit were advised accordingly.

The number of competitions for vacant positions in the Ministry increased slightly over the previous year.

The Personnel Services Branch was assigned the responsibility for implementing a training program in relation to Project Access. This program to improve the way government conducts business with the public resulted in several training sessions being conducted within the Ministry by the Women's Advisor and the Staff Development Co-ordinator. The Ministry continued to conduct internal staff development courses; in addition, the utilization of Central Agency staff for the running of selection process workshops increased.

Training and Certification

The Training and Certification Section is responsible for the Ministry's technical training program in pollution abatement and control and, in co-operation with other agencies, the certification programs for Ministry and non-Ministry personnel.

During 1979-80, the Section conducted 57 courses, workshops and seminars that were attended by 700 Ministry and 760 non-Ministry personnel. Twenty-six trainees were from provinces other than Ontario. Seventy-two Ministry personnel were recertified, and three Ministry and six non-Ministry personnel obtained initial certification in the identification of opacities of visible emissions. Eleven Ministry and eight non-Ministry personnel were certified as Noise Control Officers Class III, having completed all four parts of the Acoustics Technology Certificate Course.

Two new workshops—handling hazardous materials emergencies and wastewater collection system operations and maintenance—were included in the program. A number of short workshops on pump maintenance were conducted in the Ministry's Northeastern and Northwestern Regions. Basic gas chlorination workshops were held in Ottawa and Burlington for Municipal staff.

The section continued to participate in the development of a program for the voluntary certification of water and wastewater utility operators. Information on progress in this area was presented at a number of meetings of operators and associations at various locations in the Province.

Development of the education centre at the Ministry's experimental facility, Brampton, continued. Because of government restraints, new construction will be delayed. Alternative solutions to provide additional classroom, laboratory and workshop facilities were being investigated at year-end.

Affirmative Action

The Affirmative Action Program under the administration of the Women's Advisor continued with the activities established in 1978-79. Included were monthly meetings with the Women's Advisory Committee and meetings with the six Regional representatives. Three editions of the newsletter were produced as well as a brochure "Women in the Environment" which will be used in Outreach activities. A resource handbook containing a wide scope of pertinent information for all Ministry employees was about to go to print at year-end. An index of all courses, with emphasis on extension courses at Ontario universities and colleges and arranged by areas of study, was also being prepared. Numerical targets were set for hiring or promotion in six areas in which women have been under-represented in the Ministry. Outreach activities at the high school level throughout the Province are planned to help increase the pool of qualified women in science and engineering.

Safety

As of April 1, 1979, the responsibility for development of the safety program and safety policy

was returned to the Branch. In October 1979, the Occupational Health and Safety Act was proclaimed. As a result, the Branch immediately initiated training for all supervisory staff on the implications of the legislation. Work also progressed on the rewriting of the Ministry Safety Policy and Procedures Manual.

Employee Relations

At least five local and Ministry employee relations committees were active in 1979-80. Much of the discussion within these committees centred on health and safety, but other topics such as hours of work, project transfers and clothing issue received much attention. As a direct result of discussion by the Ministry's Employee Relations Committee, an understanding was reached between the Union and the Ministry on the formulation, structure and function of safety committees under the legislation. The Ministry was proceeding to formulate the committees in conjunction with this understanding at year-end. Agreements concerning compressed work weeks were also signed in two locations as a result of local employee relations committee meetings.

French Language Services

Co-ordinator: G. MacNaughton

The Ministry of the Environment hired a full-time French language services co-ordinator in August 1979 to develop and implement a Ministry policy on French language services in order to assist the Ministry in responding to the needs of the French-speaking population in Ontario. The co-ordinator works within the Ministry to plan for improved French language services with the general public and maintains a liaison between the Franco-Ontarian community and the Ministry.

Activities during the year included: the establishment of a Ministry French language services policy covering communications, information, forms, signage, staffing and French language training and the compilation of an inventory of staff with a French-speaking capability. The co-ordinator also reviewed all Ministry forms and publications and identified those that should be made available in both French and English. As well, steps were taken to increase the number of staff involved in French language training.

At year's end, the Ministry offered 27 publications in the French language, including Cottage Country, an environmental manual for the cottager, and the annual three-volume "Guide to Eating Ontario Sports Fish". Several news releases were also distributed in French to Francophone areas of the Province. For the first time, the Information Services Branch operated a display at the Montreal Boat Show, known as "Salon Nautique", with Ontario's boating regulations distributed in both English and French in order to inform Quebec sailors about waste disposal methods and facilities in the use of Ontario waterways.

boards and commissions

The Waste Management Advisory Board

Chairman: R.H. Woolvett

The Waste Management Advisory Board was established in 1975 by Order-in-Council to provide advice to the Minister of the Environment on matters relating to the management of waste in Ontario, with particular emphasis on the means of reducing waste generation and recovering valuable materials from the waste stream.

During 1979-80, the Advisory Board undertook a major review of its terms of reference, which, with the concurrence of the Minister, were made to read as follows:

- "to provide advice to the Minister on any matter which the Minister may refer to the Board in writing;
- "to provide comment or advice directly to the Minister on any matter of high public concern in the short-, medium-, or long-term related to the reduction and management of wastes in Ontario;
- "to review and advise the Minister directly on the priorities for action by the Province in the total area of waste management, and also;
- "to comment on the effectiveness of existing waste management programs and activities."

Four original members of the Advisory Board resigned during the year; Mr. P.C. Eberlee (Vice-Chairman), Mr. M. Hotte, Mr. G.R. Robertson, and Professor M. Wayman. Replacement member appointments were pending at year-end, as was the appointment of an additional Board member intended to increase the Board's complement to 12 members. The Board held eight meetings totalling 13 days in 1979-80.

The Advisory Board conducted a considerable number of investigations during the year and published a wide variety of reports and other documents prepared by Board member committees, secretariat staff, and contracted consultants. Subject areas selected for study by the Board are chosen on a priority basis aimed at achieving maximum gains in waste management.

In the area of waste management planning: a consultant was chosen to begin development of a strategic waste management planning model; the development and pilot implementation phases were completed of a proposed waste management accounting system for municipalities; a study was completed of fiscal and regulatory methods for reducing the

environmental impacts of urban waste; an investigation was conducted of how government waste management practices could be improved; an analysis was completed of the evolution of the "throwaway society"; a study was completed of attitudes and positions of industrial, labor and consumer groups towards products with recycled content.

In the area of source separation: policy proposals were developed in conjunction with the Waste Management Branch and the Program Planning Branch for submission to the Minister; work continued on the preparation of guidelines for implementing residential source separation programs; a state-of-the-art study was completed of significant existing and proposed residential source separation programs; an evaluation was conducted of the role of handling stations in waste reclamation systems; a pilot project, co-sponsored by the Board and Environment Canada, was run in the Kitchener-Waterloo area to recover used motor oil from do-it-yourself oil-changers; assistance was given to the Ministry of Correctional Services towards setting up waste recovery programs in Ontario prisons; funding was provided for the analysis of a glass source separation program in the City of Kanata, in Ottawa-Carleton.

In the area of paper recovery: the Working Group on Waste Paper Utilization completed its two-year work program, which included the development of waste paper flow charts for the Province; the Board participated in a pilot project run by the Ministry's Waste Paper Reduction Committee; guidelines for implementing an office waste paper recovery program were completed and published; a report was completed on the recovery of waste cardboard from marginal (small-volume) sources.

In the packaging area: the Board and Ministry co-sponsored an environmental packaging design competition for students enrolled in post-secondary schools as well as an exhibit at PAC Ex '79, the packaging industry trade show, at which competition awards were presented. Discussions were also continued with the Packaging Association of Canada on the environmental aspects of packaging; the use of refillable and non-refillable containers for carbonated soft drinks continued to be monitored; attempts were continued to have a new family of refillable continers for fluid milk developed; a report was completed on the feasibility of making wine and spirits containers returnable to LCBO outlets.

In other areas: a state-of-the-art assessment of litter abatement programs was completed; a home composting kit was published.

The Advisory Board's recommendations to the Minister of the Environment during 1979-80 were concerned with its terms of reference, waste management planning, provincial policy on source separation, paper consumption, milk packaging and wine and spirits packaging.

The Environmental Assessment Board

*Chairman: K.H. Sharpe

The Environmental Assessment Board conducts public hearings on environmental issues under The Environmental Assessment Act, The Ontario Water Resources Act and The Environmental Protection Act. Hearings are also held by the Board under Orders-in-Council, as directed by Cabinet.

Board membership on March 31, 1980 consisted of 18 persons, including two new members appointed during the year—Mr. D.M. Coolican of Ottawa and Mr. W.A.J. Roy of Paincourt.

During 1979-80, the Board conducted 26 hearings under The Ontario Water Resources Act. These hearings pertained to applications for approval of the construction or extension of mechanical sewage treatment plants and lagoons, as well as sanitary and storm sewers.

The Board held nine hearings under The Environmental Protection Act concerning applications for approval of landfill sites or landfill site extensions. One of these hearings concerned an application for the approval of a waste transfer station. Board reports on hearings, containing recommendations, are forwarded to the Director of the Environmental Approvals Branch, as required by statute.

The Board's report of the Order-in-Council hearing into uranium mine expansion in the Elliot Lake area was forwarded to the Minister in May 1979. (This hearing began in November 1976 and ended in March 1979.) The Order-in-Council hearing undertaken in March 1979 into the proposed burning of polychlorinated biphenyls at the St. Lawrence Cement Company in the City of Mississauga had not been conducted by the year-end.

The first hearing under The Environmental Assessment Act was referred by the Minister to the Board late in the year and was scheduled to commence in April 1980.

*B.E. Smith was appointed chairman on the retirement of K.H. Sharpe in October 1980.

The Pesticides Advisory Committee

Chairman: Dr. G.S. Cooper

Established under The Pesticides Act, 1970, the Pesticides Advisory Committee annually reviews the Act, its regulations, the government publications concerning pests and pesticides. The Committee also enquires into matters relating to pesticides and the control of pests as

deemed necessary or as prescribed by the regulations.

In 1979-80, the Committee consisted of a chairman and 14 members drawn from universities, agriculture, industry, the provincial civil service and the federal government. Dr. D.N. Huntley, Chairman since 1976, retired in March 1980, and was succeeded by Dr. G.S. Cooper.

The Committee recommended several changes to Ontario Regulation 618/74; reassessed 17 previously classified compounds, seven of which were placed in Schedule 1; reviewed and evaluated the environmental impact, toxicity and hazard of ten new or previously non-classified active ingredients; evaluated 205 newly registered pesticide products and recommended for each a classification for storage, sale and use in Ontario. A field trip to observe spray practices by three provincial government agencies was carried out in June 1979, and recommendations were submitted to the Minister. In addition, an on-going review and assessment of current scientific data relative to phenoxy herbicides was continued and accelerated, while a review of compounds used for the control of spruce budworm in Ontario was initiated.

The Committee continued a research program established in 1973 with three major objectives:

(1) to find alternative pesticides for those deemed environmentally hazardous and those restricted in use;
(2) to determine potential environmental hazards with pesticides currently in use;
(3) to reduce pesticide input into the environment.

The Committee received 45 research proposals, 26 of which were funded by the Ministry through the Committee at total amount of $296,775. A two-day research seminar was held in January 1980, at which recipients of grants reported on their findings. An assessment of this research is prepared annually and submitted to the Ministry.

All 1979-80 publications of the Ministries of Agriculture and Food, Environment and Natural Resources concerned with pesticides were reviewed and endorsed prior to printing and distribution.

The Farm Pollution Advisory Committee

Chairman: O. Crone

Consisting of four farmers, this Committee provides objective assessments of farm environmental situations as requested by Ministry officials. The Committee visits farms to investigate complaints and makes recommendations, where deemed necessary, concerning manure storage and spreading, cultiviation, yard drainage and ventilation of livestock and poultry buildings.

In 1979 the Committee investigated six farm operations which Ministry of the Environment staff had been dealing with as a result of citizen complaints. Two were pork producers, two beef, one horse and one chicken producer. Recommendations to upgrade operational practices were made with regard to four of the investigations.

The Committee also investigated seven farm operations in the Southwestern Region which had had manure spills in the Spring, causing fish kills, and advised on how to avoid future spills.

The major problem dealt with in 1979 was manure entering into watercourses.

The Environmental Appeal Board

Chairman: L.C. DeGroot

Established under The Environmental Protection Act, 1971, the Environmental Appeal Board provides an appeal mechanism for persons affected by certain decisions made by the Ministry of the Environment or local health units. The Board consists of 12 part-time members, including the Chairman, from various occupations and parts of the Province.

On November 13, 1979, The Pesticides Amendment Act was given Royal Assent with the result that the Pesticides Appeal Board was dissolved and its responsibilities transferred to the Environmental Appeal Board. Therefore, in accordance with The Pesticides Act, 1973, the Environmental Appeal Board now also provides an appeal mechanism for persons affected by certain decisions of the Ministry of the Environment regarding the control of pesticides.

In 1979-80, the Board received 52 valid appeals. Approximately 66 per cent of the appeals concerned decisions of local health units on private sewage systems. The remaining appeals resulted from Ministry of the Environment decisions regarding waste disposal sites, waste management systems, waterworks and air pollution control. The board also dealt with one appeal under The Pesticides Act that had not been heard by the Pesticides Appeal Board when it was dissolved.

The Board held 28 days of hearings in 1979-80. It resolved 37 of the appeals received during the year as well as nine appeals from the previous year. Two appeals from the previous year remained in abeyance, while hearings in two matters were not yet completed. At year-end, decisions remained to be issued, or hearings held, on 15 appeals.

The Royal Commission on the Northern Environment

Chairman: J.E.J. Fahlgren

The Royal Commission of the Northern Environment was established in July 1977 to determine the effects of major enterprises north of the 50th parallel on the natural environment and social, economic and cultural conditions in Northern Ontario to investigate the feasibility of alternative uses of natural resources; to suggest ways and means of assessing and deciding on environmental aspects of major enterprises.

In 1979, recognizing that the delivery of its program is the dominant role of the Commission, Commissioner Fahlgren restructured the organization so that all Commission programs are delivered through the Thunder Bay head office from where all activities are directed. The support program activities such as library services, finance and administration are based in the Toronto office. The Commission also continues to maintain an information office in Timmins.

The objectives and work program announced by Commissioner Fahlgren in November 1978 have been fine-tuned to a clearly-defined "Future Directions" program from which specific studies and other activities continue to be derived.

To name a few:

An agreement was negotiated with Lakehead University to undertake a study of the economic future of forestry and related activities in and around Ontario north of the 50th parallel. Through analysis of such aspects as markets, transportation, wood availability, mill costs and capital costs, this study is establishing what the likelihood is that new forest industry development or other activities related to forest products will take place in the area.

Another contract has been negotiated with the Laurentian University to examine factors governing the prospects for mining development north of 50° latitude. These include: world market demand and alternative supply for base and precious metals and uranium; mineral occurences; cost factors related to the opening of new mines; and environmental regulations.

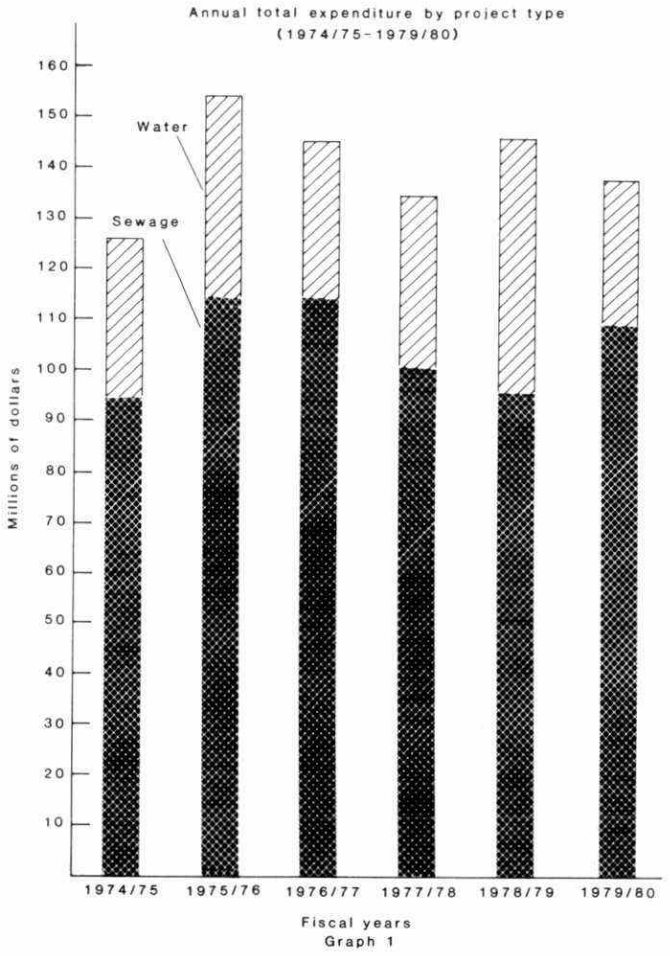
A study is also under way of methods to assess and evaluate socio-economic impacts in a northern environment which is typically characterized by fragile ecosystems, large-scale natural resource based developments and a sparse, predominantly native population.

During this past fiscal year, the Commission supported the public interest program and subsidized 37 recipients in the amount of $250,000. Submissions which may be of interest to the public at large will be published.

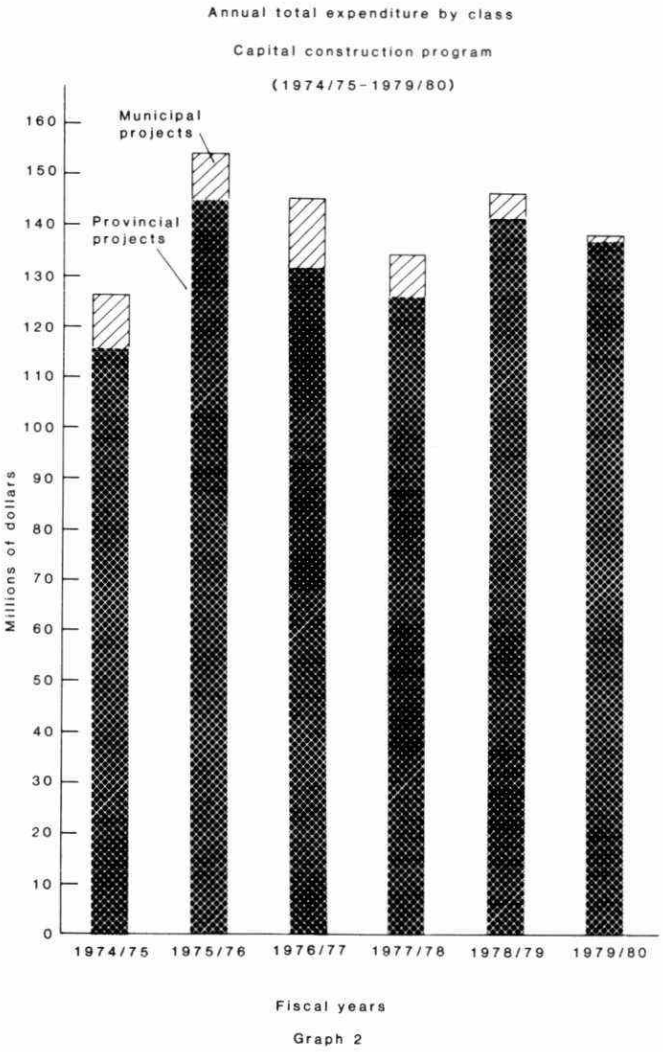
The Commission is negotiating with native organizations to develop a public interest subsidy program directly related to the aims and objectives of the "Future Directions" program. This subsidy program would involve the native communities in the gathering and collecting of data and information essential to the determination of alternatives and/or consequences related to the development of major enterprises in the north.

Commissioner Fahlgren is currently preparing an interim report, anticipated to be released early in 1981.

appendices



Graph 1



Graph 2

TABLE I

CAPITAL CONSTRUCTION PROGRAM

Annual Total Expenditure by Project Type

Fiscal Year	Sewage	Water	Total* ($ millions)
1972/73	54.4	26.0	80.4
73/74	68.4	13.1	81.5
74/75	94.8	32.0	126.8
75/76	114.8	40.1	154.9
76/77	114.8	31.2	146.0
77/78	101.0	34.1	135.1
78/79	96.6	50.7	147.3
79/80	110.6	28.9	139.5

*Includes costs of engineering, property and miscellaneous items as well as contract prices.

TABLE II

CAPITAL CONSTRUCTION PROGRAM

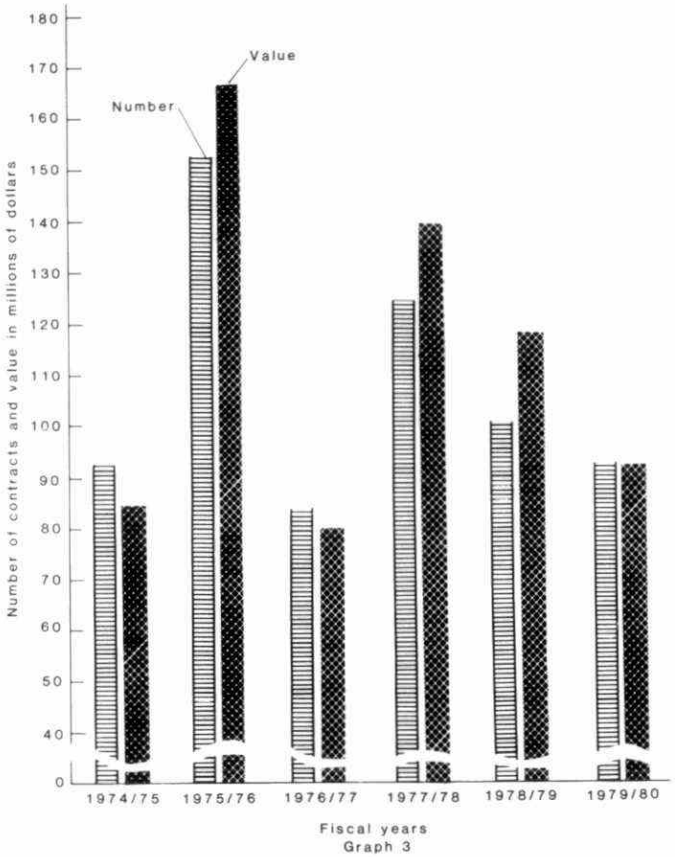
(including engineering design, property acquisition, misc. expenditures)

Annual Total Expenditure by Class

Fiscal Year	Provincial Projects	Municipal Projects	Total ($ millions)
1972/73	77.6	2.8	80.4
73/74	75.5	6.0	81.5
74/75	115.4	11.4	126.8
75/76	145.2	9.7	154.9
76/77	131.8	14.2	146.0
77/78	127.0	8.1	135.1
78/79	142.9	4.4	147.3
79/80	138.3	1.2	139.5

Number and value of contracts tendered annually

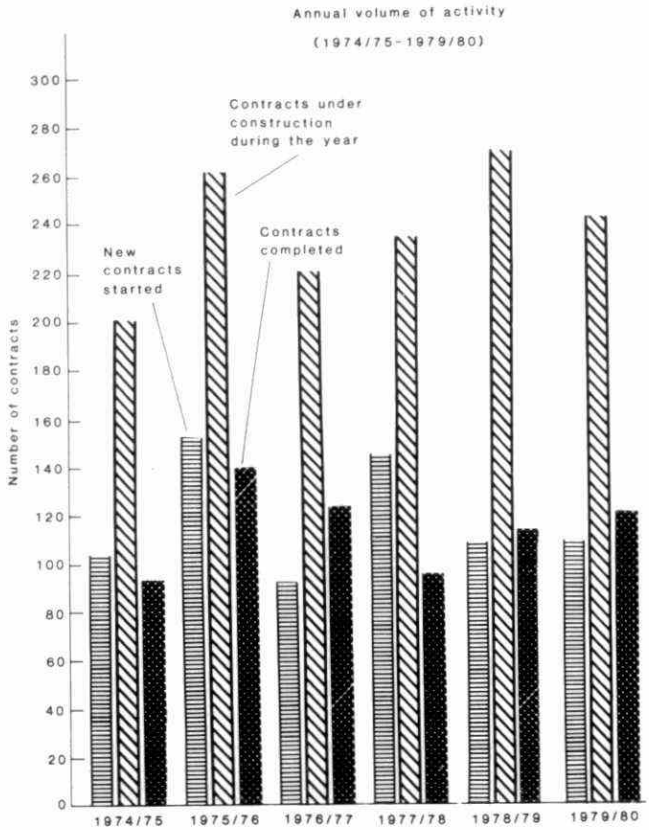
(1974/75-1979/80)



Graph 3

Annual volume of activity

(1974/75-1979/80)



Graph 4

TABLE III

CAPITAL CONSTRUCTION PROGRAM

Number and Value of Contracts Tendered Annually

Fiscal Year	Number	Value ($ Millions)
1972/73	99	72.4
73/74	108	91.3
74/75	92	84.1
75/76	153	167.6
76/77	84	79.6
77/78	125	140.5
78/79	99	116.3
79/80	93	93.0

TABLE IV

CAPITAL CONSTRUCTION PROGRAM

Annual Volume of Activity

Fiscal Year	(Number of Contracts) Started	Under Construction	Completed
1972/73	88	166	92
73/74	108	182	82
74/75	102	202	93
75/76	153	262	139
76/77	92	215	124
77/78	145	236	96
78/79	109	249	115
79/80	110	244	122

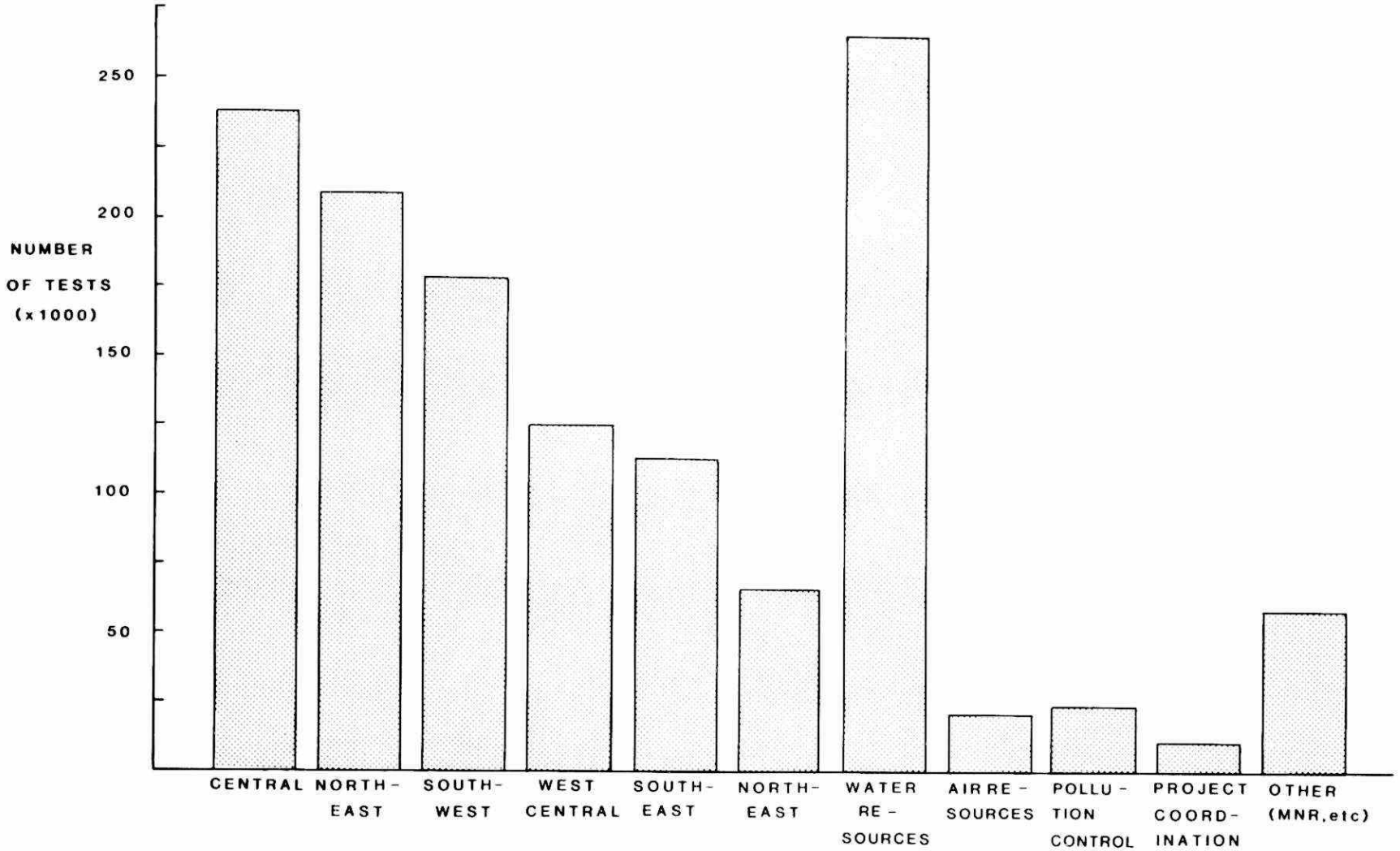


Diagram 1: Laboratory workload by region/branch, 1979/80

DIAGRAM 2-MOE PROGRAMS-LABORATORY SUPPORT

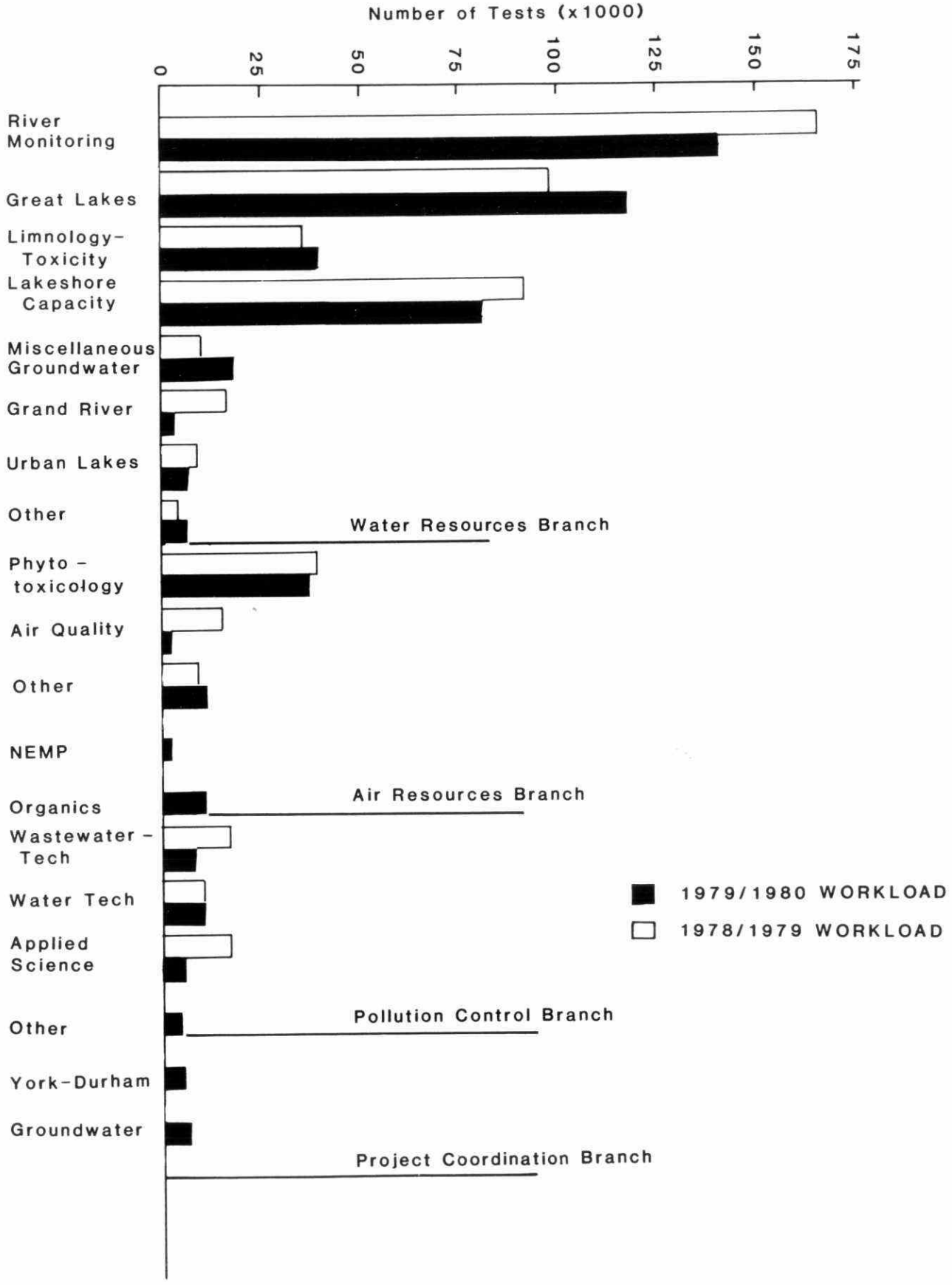


DIAGRAM 2 (Con't)-MOE PROGRAMS - LABORATORY SUPPORT

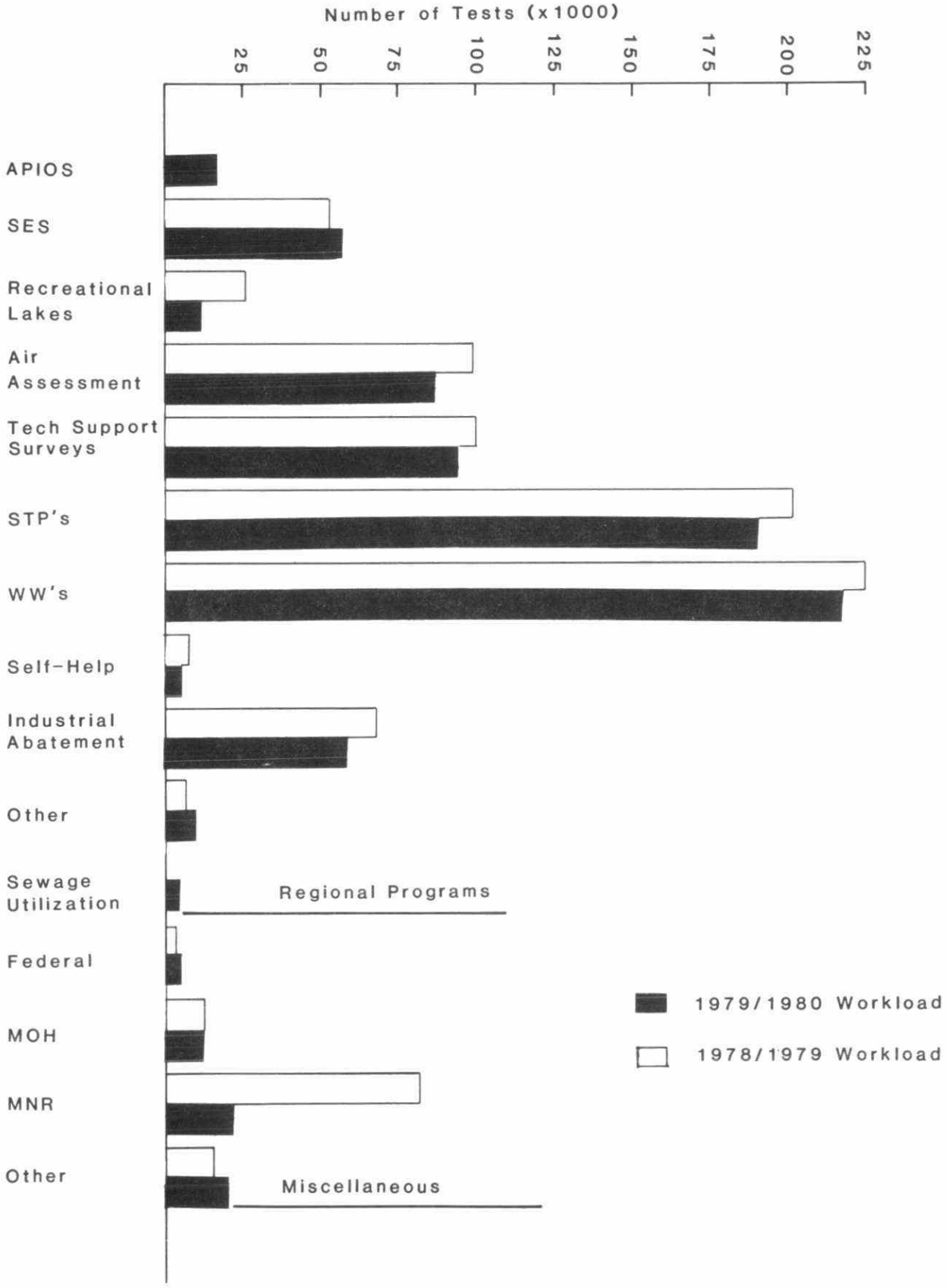


TABLE IV

ONTARIO'S AIR POLLUTION INDEX

DATE STARTED

TORONTO	MARCH 23, 1970	WELLAND	JAN. 1, 1974 (CLOSED OCT. 26, 1978)
HAMILTON	JUNE 15, 1970	NIAGARA FALLS	NOVEMBER 1, 1974
SUDBURY	JANUARY 16, 1971	CONISTON	FEBRUARY 18, 1975
WINDSOR	MARCH 19, 1971	NEW SUDBURY	MARCH 1, 1976
HAPPY VALLEY	MAY 13, 1971 (CLOSED JAN. 1975)	SARNIA (14049)	DEC. 1, 1977 (CLOSED AUG. 30, 1978)
		SARNIA (14064)	SEPTEMBER 1, 1978

YEAR	CITY	NUMBER OF OCCASIONS 10 ≥32 30	10 ≥50 30
1970	TORONTO		
	HAMILTON		
1971	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR		
	HAPPY VALLEY		
1972	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR		
	HAPPY VALLEY		
1973	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR		
	HAPPY VALLEY		
1974	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR		
	HAPPY VALLEY		
	WELLAND		
	NIAGARA FALLS		
1975	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR		
	WELLAND		
	NIAGARA FALLS		
	CONISTON		
1976	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR		
	WELLAND		
	NIAGARA FALLS		
	CONISTON		
	NEW SUDBURY		

YEAR	CITY	NUMBER OF OCCASIONS 10 ≥32 30	10 ≥50 30
1977	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR (12008)		
	WELLAND		
	NIAGARA FALLS		
	CONISTON		
	WINDSOR (12016)		
	NEW SUDBURY		
	SARNIA		
1978	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR (12008)		
	WELLAND		
	NIAGARA FALLS		
	CONISTON		
	WINDSOR (12016)		
	NEW SUDBURY		
	SARNIA (14045)		
	SARNIA (14064		
1979	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR (12008)		
	NIAGARA FALLS		
	CONISTON		
	WINDSOR (12016)		
	NEW SUDBURY		
	SARNIA		
	ST. CATHARINES		
1980	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR (12008)		
	WINDSOR (12016)		
	NIAGARA FALLS		
	CONISTON		
	NEW SUDBURY		
	SARNIA		
	ST. CATHARINES		

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